Productivity and Profitability with Elga cored wires
Why cored wire?

Cored wires experienced a real breakthrough in the 80’s and rapidly gained in popularity. The objective was to weld more efficiently, compared to the coated electrode.

Since then a great deal of research and development has been invested in the areas of arc characteristics, operability and mechanical properties. The result is that today welding with cored wires offers a whole range of advantages compared to both stick electrodes and solid wire. The key word is productivity, achieved by the twin advantages of higher deposition rate and increased arc time factor.

In addition, Elga cored wires also help reduce interruptions to production caused by wire feed problems and the need to change wear parts such as contact tips, gas nozzles and liners. Compared with other processes post-weld dressing, e.g. spatter removal, can also be minimised. In short, the use of cored wires reduces total labour costs – the prime objective.

Initially cored wires were only suitable for thicker materials and had limited positionality. Today fully positional welding in material thicknesses down to 2-3 mm presents no problems, thanks to continuous product development in cooperation with end users.
# Contents

The brochure divides the welding industry into major segments and provides background information and cored wire recommendations for each specific sector: Heavy vehicals, Shipbuilding, Steel fabrication, Paper and pulp industry, Process pipe fabrication and Offshore. At the back can be found tables for selection of cored wires related to steel strength and grade. In addition, there is a summary of wire classification, shielding gas, weld metal mechanical properties etc.

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With reservation for product specification changes.
Elga is one of the biggest operators in the European welding business for consumables. Over the years we have satisfied the extremely high quality demands from exacting industrial sectors such as offshore, shipbuilding and heavy vehicles. By a process of continuous development, often in close cooperation with customers, we have successively built up our knowledge base and with it a comprehensive cored wire programme.

Elga has been working with cored wire since the mid-80’s and from the very start became one of the market leaders in unalloyed, low alloyed and stainless steel products. The wires are marketed under the brand names Elgacore (unalloyed and low alloyed) and Cromacore (stainless).

**Elga cored wire types**

**Elga flux cored wires**
The distinguishing feature of flux cored wires is that they form a slag which can support the weld pool and thereby provide positional welding characteristics. There are both rutile and basic flux cored wires but the rutile type dominates on the market due to superior operability.

Elga rutile wires provide very good operability in all positions. The low alloyed range offers excellent fracture toughness at temperatures down to -60°C, both in the as-welded and stress relieved condition. Common to the complete Elgacore programme is a deposited metal hydrogen level below 5ml/100g.

All Elga rutile wires produce high quality root beads on ceramic backing.

Basic flux cored wires are not used to any great extent due to their comparatively limited welding characteristics and consequent lack of welder friendliness. Within these limitations however basic wires offer good low temperature fracture toughness and good crack resistance under conditions of high restraint, e.g. fillet welds in thick material.

**Elga metal cored wires**
Metal cored wires contain little or no flux and so produce only a very small amount of slag, similar to that from a solid wire. The core is composed mainly of metal powder which in turn contributes to increased productivity. The deposition efficiency is 96%, against 86% for a rutile flux cored wire, resulting in a higher deposition rate.

Metal cored wires give very good penetration, similar to solid wire, but with the added advantage of a wider penetration profile. The combination of these two factors reduces the risk of lack of fusion and root defects. Today’s wires can be used for plate thicknesses down to 2-3 mm and, together with the advantages previously mentioned, has led to them replacing solid wire in many applications. Metal cored wires permit a significantly higher travel speed, minimal spatter and less stop/start problems.

This wire type has limited positional operability since it lacks a supporting slag. In the spray transfer mode the wire is suitable for applications in the flat and horizontal positions. In the short arc mode it can also be used vertically up, which is a widely used method for the root bead in single sided welding without ceramic backing.

Metal cored wires are used extensively in mechanised and robotic applications but recent years have also seen their increasing use for manual welding, as an alternative to both solid and rutile flux cored wires.

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**Exceptionally good wire feeding characteristics**
Important to this success story have been the extremely good wire feeding and operability characteristics combined with reliable batch-to-batch consistency, which together ensure that production at our customers runs with a minimum of interruptions. This is particularly important with robotic welding where Elga cored wires are often chosen as a matter of course.

**Qualified technical support**
A determining service factor with Elga is our qualified technical backup, available on the job or via the telephone. We can help you with welding cost and profitability calculations, technical advice, guidance on procedures, preparation of WPSs etc. We always strive to put our customers first, to help you achieve both productivity and profitability in the best possible way.
Productivity and profitability

The welding industry is continuously moving towards increasingly efficient methods of production. The shift from the coated electrode, via sold wire, to cored wires has gone relatively quickly. During the 80’s and 90’s companies really began to appreciate the advantages cored wires had to offer and this development has accelerated ever since. In the same way the number of mechanised and robotic welding stations is growing continuously as a result of demand for increased profitability.

Today the selection of consumables is no longer only a matter of base material, weld requirements, process and price. The most important factor is to evaluate total costs, including utilization of valuable working time, and thereby to view welding from the profitability perspective.

The future will demand a greater holistic approach, with an understanding of the welding process, work routines and the environment, in combination with low total costs.

**Increased productivity**

As part of its business concept Elga has over the years helped both small and large businesses increase productivity and thereby profitability. For many companies simply the implementation of cored wire has been the solution with respect to productivity, as well as quality and working environment considerations.

**Seamless or strip based cored wires**

There are two types of cored wire design depending on method of manufacture, seamless and strip based. In general wires made from a strip rolled into a tube with butted edges have a thinner wall thickness than those originating from a pre-formed tube i.e. seamless wires. The difference shows itself in practise by a higher wire feed speed at a given current with strip based wires, which means more kilograms of wire are deposited during a specific time at identical welding current settings.

Elga has chosen the strip based core wire design on account of, among other things, its higher deposition rate and thereby its greater productivity.

Minimising interruptions to production

Recognise the following situations?

- wire feed problems
- wire fusing to contact tip
- excessive spatter
- need to remove spatter from job

**Interuptions to the production process are nothing other than wasted time and effort and can be the difference between profitable and non-profitable production.**

Simple calculations clearly show that minimising interruptions to production is an important factor to be taken into consideration when selecting a cored wire. Elga cored wires have exceptionally good wire feeding characteristics and weld with a stable, smooth arc producing negligible spatter.
Heavy vehical industry

This sector covers construction machines such as loaders, dumpers and tractors, industrial trucks and heavy duty lorries, as well as the production of component parts for all these.

During the last decade the heavy vehical sector has become a very important part of the European manufacturing industrial scene. In particular, Northern Europe has proved it can design, develop and produce high quality, high technology heavy duty vehicals in the face of severe competition from low cost countries. Elga, with its continuous development of products together with end users, has been in prime position to supply manufacturers with cored wires which combine high wire quality with excellent weld properties and in this way create conditions for the industry to increase its profitability. In pace with the sector’s shift to mechanised and robotic welding stations in their production lines, Elga has developed a customised core wire programme which has become renowned. In many instances Elga has become the natural choice of wire supplier for robotic welding.

Steel grades

This sector uses everything from ordinary C-Mn grades like S355 to high strength steels such as Weldox 700, as well as wear plate of the types Hardox 400 and 500.

Typical for welding of these heavy duty vehicals is that the construction is designed in such a way that the welded joint is not subject to maximum loading conditions and does not therefore have to have the same yield strength as the base material. On the otherhand, as the finished product is exposed to a high degree of dynamic loading it is very important that the weld joint has excellent resistance to fatigue. This can be achieved by the use of a lower strength, undermatching filler material and ensuring a smooth interface with the base material. For this reason it is seldom one finds high strength welding consumables in this sector, even if the use of high strength steel for this application is increasing rapidly.

Photo: Volvo

Welding of a Volvo dumper frame with Elgacore MXA 100.

Photo: Volvo
Rutile flux cored wires

Elgacore DWA 50
The classic wire for non alloyed steels.
Elgacore DWA 50 is intended for welding mild and C-Mn structural steels. It is fully positional. Ease of use and high productivity, in combination with good mechanical properties, make Elgacore DWA 50 an extremely versatile general purpose cored wire.

Elgacore DWX 50
All-round wire specially suitable for thinner material.
Elgacore DWX 50 is fully positional and mainly developed for welding thinner sections, small fillets and root beads on ceramic backing where the root gap is large or varies. It runs with a very stable arc down to 140-150 A. DWX 50 is a dual gas wire and has excellent resistance to porosity on primed plate when run on CO2 shielding gas.

Ideal for mechanised welding of standing fillets.

Elgacore DWA 55E
All-round wire for applications down to -40°C.
Elgacore DWA 55E deposits a 0.4% Ni alloyed weld metal with a yield strength of 570MPa, designed to meet requirements for very good fracture toughness at temperatures down to -40°C. The wire has excellent welding characteristics in all positions.

Metal cored wires

Elgacore MXA 100
For greater efficiency with manual, mechanised or robotic welding.
Elgacore MXA 100 is designed for high productivity butt and fillet welding in the spray arc mode. It has very good fracture toughness down to -40°C and is suitable for a wide range of steels and applications. The perfect cored wire for mechanised and robotic welding.

Elgacore MXX 100
Greater efficiency in thinner material.
Elgacore MXX 100 is designed for high productivity welding of thinner sections and smaller fillet sizes. It produces good fracture toughness down to -30°C and is suitable for mild and C-Mn structural steels. Elgacore MXX 100 is the perfect cored wire for mechanised and robotic welding in thinner material.

For improved profitability

Problem-free production with Elga cored wires
- Exceptionally good wire feeding due to extremely clean surface
- Reliable batch-to-batch consistency
- Weld with a stable, smooth arc
- Negligible spatter = little or no post-weld dressing
- High deposition rates
- Comprehensive range

Ideal with ceramic backing!
Shipbuilding & steel fabrication

Shipbuilding

Although much of ship construction has moved from Europe to S-E Asia, the shipbuilding industry is still a very important fabrication sector for Elga. In the beginning of the 80’s welding in the shipyards was revolutionised by the introduction of cored wires and Elga, with its comprehensive range, was one of the leaders in this development. Ever since then Elga cored wires have remained at the forefront when it concerns productivity and profitability in shipyards, including those specialising in chemical carriers.

Elgacore DWA 50, DWX 50, DWA 55L, MXA 100 and MX 100T are examples of wires typically used by these yards, complemented by Cromacore DW 316LP, DW 309LP and DW 329AP Duplex for stainless fabrication.

Steel grades

Ship’s steel is supplied according to the Classification Society rules and common grades to be found are A, D36 and E36. Grade A has minimum yield strength of 235MPa and impact strength testing at +20ºC, whilst grades D36 and E36 have minimum yield strength of 355Mpa and impact strength testing at -20ºC and -40ºC respectively. Very high strength ship’s steel up to 690MPa also occurs.

The two most common stainless steel grades used for chemical carrier work are 316LN and Duplex.

Steel fabrication

As well as structural steel fabrication in civil engineering, this sector covers a large working range from general fabrication in small workshops to advanced constructions in the power generation industry e.g. hydro and wind power plant. Elga has a long history as consumables supplier to this segment and a major project that chose Elga cored wires was the suspension bridge section of the Öresund Link, the road-rail connection between Sweden and Denmark that was opened in 2000.

Typical cored wires for non alloy and fine grain steel fabrication are Elgacore DWA 50, DWX 50, MXA 100 and MXX 100. For stainless steel fabrication in this sector typical wires are Cromacore 316LP and 309LP.

Steel grades

Structural steels are classified according to EN 10025 and two of the most common steel grades are S235JRG2 and S355J2G3. S235JRG2 has a minimum yield strength of 235MPa together with minimum impact strength of 27J at +20ºC, whilst S355J2G3 has minimum yield strength of 335MPa together with minimum impact strength of 27J at -20ºC. There is increasing use of fine grained cold forming high strength steels typified by grades S420-S690.

In addition to cored wires, Elga also provided welder training and technical support at all stages of the Öresund Link project, from start-up to full production. Photo: Søren Madsen
**Rutile flux cored wires**

**Elgacore DWA 50**
*The classic wire for non alloyed steels.*
Elgacore DWA 50 is intended for welding mild and C-Mn structural steels. It is fully positional. Ease of use and high productivity, in combination with good mechanical properties, make Elgacore DWA 50 an extremely versatile general purpose cored wire.

**Elgacore DWX 50**
*All-round wire specially suitable for thinner material.*
Elgacore DWX 50 is fully positional and mainly developed for welding thinner sections, small fillets and root beads on ceramic backing where the root gap is large or varies. It runs with a very stable arc down to 140-150 A. DWX 50 is a dual gas wire and has excellent resistance to porosity on primed plate when run on CO₂ shielding gas. Ideal for mechanised welding of standing fillets.

**Elgacore DWA 55L**
*Classic all-round wire for low temperature steels when stress relief is not required.*
Elgacore DWA 55L is designed to meet exacting weld integrity demands in applications such as offshore fabrication. The micro-alloyed design, in combination with 1.5% Ni alloying level, produces a fine accicular ferrite microstructure giving excellent fracture toughness down to -60°C. Impact strength is tolerant to a wide range of heat input and preheat/interpass conditions. Elgacore DWA 55L is unique, with high CTOD values from -10°C right down to -40°C. A reliable choice for welding low temperature steel for bridges, cranes and ship’s hull sections.

**Elgacore DWA 55Ni1**
*A universal wire for low temperature steels and a broad range of users.*
Elgacore DWA 55Ni1 produces a micro-alloyed, 0.9% Ni weld metal that gives very good fracture toughness down to -60°C in the as-welded state and also down to -40°C after stress relieving. In addition it offers reliable CTOD values at -10°C.

**Metal cored wires**

**Elgacore MXA 100**
*For greater efficiency with manual, mechanised or robotic welding.* Elgacore MXA 100 is designed for high productivity butt and fillet welding in the spray arc mode. It has very good fracture toughness down to -40°C and is suitable for a wide range of steels and applications. The perfect cored wire for mechanised and robotic welding.

**Elgacore MX 100T**
*Increase root pass efficiency with this wire.*
Elgacore MX 100T is specially developed for single-sided root pass welding, using the short arc process. Root passes normally made with the TIG or MMA process can be welded with Elgacore MX 100T with significantly increased productivity.

**Elgacore MXX 100**
*Greater efficiency in thinner material.*
Elgacore MXX 100 is designed for high productivity welding of thinner sections and smaller fillet sizes. It produces good fracture toughness down to -30°C and is suitable for mild and C-Mn structural steels. Elgacore MXX 100 is the perfect cored wire for mechanised and robotic welding in thinner material.

**Elgacore MXA 100XP**
*A universal metal cored wire with a broad application range.* Elgacore MXA 100XP is fully positional, including exceptionally good vertical down operability using negative polarity. For all other positions either DC- or DC+ may be employed with equally good, stable, low spatter arc characteristics. Elgacore MXA 100XP has very good fracture toughness down to -40°C and with its superior wire feeding and weld metal hydrogen content <5ml/100g is ideal for general fabrication, structural steelwork and shipbuilding.

**Stainless steel cored wires**

**Cromacore DW 316LP**
*Fully positional rutile flux cored wire for welding stainless grades 316 and 316L.*
Cromacore DW 316LP is specially designed for use at high welding currents. Also suitable for related stabilised grades if service temperature is below 400°C. Cromacore DW 316LP is ideal for high productivity welding in the vertical position.

**Cromacore DW 309LP**
*With a 24% Cr, 13% Ni deposit and FN14, this rutile wire is designed for dissimilar joints between stainless and mild or low alloy steels.*
Cromacore DW 309LP is fully positional and ideal for high productivity vertical up welding. Suitable for buffer layer on mild or low alloy steels prior to overlaying with Cromacore 308L/LP, as well as joining of ferritic-martensitic stainless steels.
Paper and pulp industry

The manufacture of plant and equipment for paper mills is carried out in several European countries and is an important sector for the welding industry. Elga became one of the main suppliers to this segment in the late 80’s, thanks to its knowledge base in stainless materials which led to several introductory major projects. Fabrication of heavy sections for paper and pulp plant utilises predominantly coated electrodes, cored wires and submerged arc welding. Thinner materials are welded with the MIG/TIG processes.

Pulp processing plant usually involves pressure vessel manufacture, primarily cellulose digestors and evaporators. Welding of these is often mechanised, calling for the consistently good wire feeding characteristics that Elga cored wires are renowned for.

Steel grades

Papper-making machines are fabricated in structural steel S355 and stainless steel grades AISI 316L and similar variants. The most common stainless steel grades used in the fabrication of pulp processing plant and equipment are AISI 304L, AISI 316L and Duplex.
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<tr>
<td><em>Elgacore DWA 50</em></td>
<td>The classic wire for non alloyed steels. Elgacore DWA 50 is intended for welding mild and C-Mn structural steels. It is fully positional. Ease of use and high productivity, in combination with good mechanical properties, make Elgacore DWA 50 an extremely versatile general purpose cored wire.</td>
</tr>
<tr>
<td><em>Elgacore DWA 55E</em></td>
<td>All-round wire for applications down to -40°C. Elgacore DWA 55E deposits a 0.4% Ni alloyed weld metal with a yield strength of 570MPa, designed to meet requirements for very good fracture toughness at temperatures down to -40°C. The wire has excellent welding characteristics in all positions.</td>
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<td><strong>Stainless steel cored wires</strong></td>
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<td><em>Cromacore DW 308L</em></td>
<td>For high productivity downhand welding. Cromacore DW 308L is a rutile flux cored wire for welding stainless grades 304 and 304L. Also suitable for related stabilised grades if service temperature is below 400°C. Cromacore DW 308L is used mainly in the downhand position and is ideal for standing fillets.</td>
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<td><em>Cromacore DW 308LP</em></td>
<td>Fully positional rutile flux cored wire for welding stainless grades 304 and 304L. Cromacore 308LP is specially designed for use at high welding currents. Also suitable for stabilised grades 347 and 321 if service temperature is below 400°C. Cromacore DW 308L is ideal for high productivity welding in the vertical position.</td>
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<tr>
<td><em>Cromacore DW 316L</em></td>
<td>For high productivity downhand welding. Cromacore DW 316L is a rutile flux cored wire for welding stainless grades 316 and 316L. Also suitable for related stabilised grades if service temperature is below 400°C. Cromacore DW 316L is mainly used in the downhand position and is ideal for standing fillets. For material thicknesses less than 3.0mm use Cromacore DW 316L, 0.9mm.</td>
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<td><em>Cromacore DW 309L</em></td>
<td>Designed for dissimilar joints between stainless and mild or low alloyed steels. Cromacore DW 309L is a rutile flux cored wire for high productivity downhand welding, ideal for standing fillets. Applications include buffer layers on mild or low alloy steels prior to overlaying with Cromacore 308L/308LP and welding 13% Cr “utility stainless” types.</td>
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<td><em>Cromacore DW 329A Duplex</em></td>
<td>Rutile flux cored wire depositing a 23% Cr, 9% Ni, 3% Mo, N weld metal, intended for duplex stainless steels. Cromacore DW 329A Duplex is designed for welding in the downhand and horizontal-vertical positions only and is ideal for standing fillets. Excellent for dissimilar joints between duplex and mild or low alloy steels.</td>
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<td><strong>Metal cored wires</strong></td>
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<td><em>Elgacore MX 100T</em></td>
<td>Increase root pass efficiency with this wire. Elgacore MX 100T is specially developed for single-sided root pass welding, using the short arc process. Root passes normally made with the TIG or MMA process can be welded with Elgacore MX 100T with significantly increased productivity.</td>
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Process pipe fabrication

Welding of pipes and fittings is a steadily increasing sector, primarily to satisfy society’s growing needs for oil, gas and water as well as demands for raw materials refinement in process plant. Welding has traditionally been carried out with the MMA process and over the years Elga has played a leading role in the supply of coated electrodes. In this way we have built up a solid knowledge base in this sector which in recent years we have been able to transfer to applications that are suitable for cored wires. Process pipe fabricators demand the highest levels of quality and reliability.

Steel grades

The most common pipe steel grades are S355, ASTM A106 and A333, X52 and X65. Impact strength at -46°C and stress relief of the finished weld are often specified. AISI 316L and Duplex are the stainless grades most called for.

Elgacore DWA 55LSR

Welding procedure to fulfil the toughest demands for the Snow White project, Norway.
Welding position: PF/5G
Welding parameters: 190-210A, 22-23V, 1.3-2.0 KJ/mm
Stress relief: 570°C/110mins.
Steel grade: API 5L X65
Impact strength J, weld: Cap -46°C; 59J, 85J, 85J.
Root -46°C; 44J, 46J, 59J.
Rutile flux cored wires

**Elgacore DWA 50**
The classic wire for non alloyed steels.
Elgacore DWA 50 is intended for welding mild and C-Mn structural steels. It is fully positional. Ease of use and high productivity, in combination with good mechanical properties, make Elgacore DWA 50 an extremely versatile general purpose cored wire.

**Elgacore DWA 55L**
Classic all-round wire for low temperature steels when stress relief is not required.
Elgacore DWA 55L is designed to meet exacting weld integrity demands in applications such as offshore fabrication. The micro-alloyed design, in combination with 1.5% Ni alloying level, produces a fine acicular ferrite microstructure giving excellent fracture toughness down to -60°C. Impact strength is tolerant to a wide range of heat input and preheat/interpass conditions. Elgacore DWA 55L is unique, with high CTOD values from -10°C right down to -40°C. A reliable choice for welding low temperature steel for bridges, cranes and ship’s hull sections.

**Elgacore DWA 55LSR**
For you who must have nothing but the best.
Elgacore DWA 55LSR produces a micro-alloyed, 0.9% Ni weld metal that tolerates PWHT without degradation of low temperature fracture toughness, making it ideal for offshore and pipe welding. Elgacore DWA 55LSR produces a combination of high and stable impact strength down to -60°C and is CTOD tested, both in the as welded and stress relieved condition.

Stainless steel cored wires

**Cromacore DW 316LP**
Fully positional rutile flux cored wire for welding stainless grades 316 and 316L.
Cromacore DW 316LP is specially designed for use at high welding currents. Also suitable for related stabilised grades if service temperature is below 400°C. Cromacore DW 316LP is ideal for high productivity welding in the vertical position.

**Cromacore DW 309LP**
With a 24% Cr, 13% Ni deposit and FN14, this rutile wire is designed for dissimilar joints between stainless and mild or low alloy steels.
Cromacore DW 309LP is fully positional and ideal for high productivity vertical up welding. Suitable for buffer layer on mild or low alloy steels prior to overlaying with Cromacore 308L/LP, as well as joining of ferritic-martensitic stainless steels.

**Cromacore DW 329AP Duplex**
A rutile wire depositing a 23% Cr, 9% Ni, 3% Mo, N deposit with FN40, intended for duplex stainless steels.
Cromacore DW 329AP Duplex is specially designed for positional welding (for downhand and standing fillet welds Cromacore DW 329A Duplex is recommended). Ideal for high productivity vertical up welding and dissimilar joints between duplex and mild or low alloy steels.

Metal cored wires

**Elgacore MX 100T**
Increase root pass efficiency with this wire.
Elgacore MX 100T is specially developed for single-sided root pass welding, using the short arc process.

Root passes normally made with the TIG or MMA process can be welded with Elgacore MX 100T with significantly increased productivity.
North sea offshore yards are in many ways leaders on the world stage. During the last 30 years suppliers to the offshore sector have developed a unique competence. Activities on the northern shelf have given industry the possibility to develop and evaluate new products and new technologies. In this way Elga itself gained the opportunity for welding consumables development. Elga cored wires were revolutionary at the beginning of the 80’s and product development has always been carried out in close cooperation with the north sea offshore industry. Quality, productivity and profitability for our customers are the guiding issue when we develop consumables suitably adapted to the latest challenges in a tough environment.

Elgacore DWA 55L, DWA 55LSR, DWA 55Ni1, DWA 65L and MXA 55T have all been developed in collaboration with the highly demanding north sea industry.

Elga is one of the market leaders for supply of cored wires to the offshore sector.

Steel grades

Structural steel
Designers have successively increased the yield strength of the steel used in offshore construction from 355 MPa to 500 MPa. However, 355 MPa and 420 MPa grades are still the most common whilst 460 MPa and 500 MPa grades have been used on a smaller number of projects.

In general these steels are associated with stringent quality demands and thick sections, and consequent critical specifications for welding consumables. Standard for these is good fracture toughness at -40°C and CTOD testing at -10°C, but more recent projects have called for CTOD testing at temperatures down to -40°C.

Pipework
The most general grades used for steel pipework are A106Gr.B, A333Gr.6, X52 and X65. The latter three have impact strength requirements at -46°C, often after stress relieving which is commonly specified for pipe welding. AISI 316L and Duplex are the most frequently used stainless grades.

Grane. Process module weighing 11200 tons, fabricated by Kvaerner Egersund, being loaded onto the delivery barge. The greater part was welded with DWA 55L.

Photo: © Norsk Hydro
Rutile flux cored wires

Elgacore DWA 55L
The classic wire in the offshore sector.
Elgacore DWA 55L is designed to meet exacting weld integrity demands in applications such as offshore fabrication. The micro-alloyed design, in combination with 1.5% Ni alloying level, produces a fine accicular ferrite microstructure giving excellent fracture toughness down to -60°C. Impact strength is tolerant to a wide range of heat input and preheat/interpass conditions. Elgacore DWA 55L is unique, with high CTOD values from -10°C right down to -40°C.

This is the typical allround wire for offshore structures not requiring stress relief heat treatment.

Elgacore DWA 55LSR
For you who must have nothing but the best.
Elgacore DWA 55LSR produces a micro-alloyed, 0.9% Ni weld metal that tolerates PWHT without degradation of low temperature fracture toughness, making it ideal for offshore and pipe welding. Elgacore DWA 55LSR produces a combination of high and stable impact strength down to -60°C and is CTOD tested, both in the as welded and stress relieved condition.

Elgacore DWA 55Ni1
A universal wire for low temperature steels and a broad range of users.
Elgacore DWA 55Ni1 produces a micro-alloyed, 0.9% Ni weld metal that gives very good fracture toughness down to -60°C in the as-welded state and also down to -40°C after stress relieving. In addition it offers reliable CTOD values at -10°C.

Elgacore DWA 65L
For customers requiring very good fracture toughness combined with a good safety margin of yield strength in 500 MPa steels.
Elgacore DWA 65L deposits a micro-alloyed, 1.7% Ni, 0.1% Mo weld metal with 600 MPa yield strength level together with excellent impact strength down to -40°C, stable over a wide range of heat input and preheat/interpass conditions. Elgacore DWA 65L is CTOD tested.

Metal cored wires

Elacore MXA 55T
For higher productivity and reliable penetration.
Elacore MXA 55T has a deposition efficiency of 96% and produces a micro-alloyed, 1.7% Ni deposit. It is ideal for both root beads using short arc welding and high deposition rates in the spray transfer mode. Elgacore MXA 55T has good fracture toughness down to -60°C and is CTOD tested at -10°C.

Root runs normally carried out by TIG or MMA can be welded considerably more efficiently with Elgacore MXA 55T.

Stainless steel cored wires

Cromacore DW 316LP
Fully positional rutile flux cored wire for welding stainless grades 316 and 316L.
Cromacore DW 316LP is specially designed for use at high welding currents. Also suitable for related stabilised grades if service temperature is below 400°C. Cromacore DW 316LP is ideal for high productivity welding in the vertical position.

Cromacore DW 309LP
With a 24% Cr, 13% Ni deposit and FN14, this rutile wire is designed for dissimilar joints between stainless and mild or low alloy steels.
Cromacore DW 309LP is fully positional and ideal for high productivity vertical up welding. Suitable for buffer layer on mild or low alloy steels prior to overlaying with Cromacore 308L/LP, as well as joining of ferritic-martensitic stainless steels.

Cromacore DW 329AP Duplex
A rutile wire depositing a 23% Cr, 9% Ni, 3% Mo, N deposit with FN40, intended for duplex stainless steels.
Cromacore DW 329AP Duplex is specially designed for positional welding (for downhand and standing fillet welds). Cromacore DW 329A Duplex is recommended. Ideal for high productivity vertical up welding and dissimilar joints between duplex and mild or low alloy steels.
Selection of Elgacore wire based on steel yield strength and grade

NB! The specific application impact strength specification must always be considered. The table is a guide only. In case of uncertainty please contact customer service.

<table>
<thead>
<tr>
<th>Yield strength Min. MPa</th>
<th>Steel grade</th>
<th>Impact strength temperature requirement</th>
<th>Recommended Elgacore wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>S500QL, S500QL1, P500QL1, P500QL2, S500G2+M, NVE 500.</td>
<td>-40°C: DWA 65L.</td>
<td></td>
</tr>
<tr>
<td>550-690</td>
<td>S550, S600, S620, S650, S690.</td>
<td>Use undermatching consumable where the design allows.. Cored wire in medium strength class: EN-class T42-T46, AWS E70/E71-E80-E81. e.g. DWA 55L, MXA 100. Fillet welds can usually be made using undermatching consumable. Always use consumable in medium strength class for root pass in butt welds. Impact strength requirements should be fulfilled.</td>
<td></td>
</tr>
<tr>
<td>235-500 to 550-690</td>
<td>Use consumable that matches steel in the lowest strength class.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Selection of Cromacore wire for stainless steels

<table>
<thead>
<tr>
<th>Stainless steel type/application</th>
<th>Stainless steel grade AISI-ASTM / EN</th>
<th>Recommended Cromacore wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>304/304L</td>
<td>304/1.4301, 304L/1.4306, 304LN/1.431D Where service temperature is &lt;400ºC also 321/1.4541, 347/1.4550</td>
<td>DW308L, DW308LP</td>
</tr>
<tr>
<td>316/316L</td>
<td>316/1.4401/1.4436, 316L/1.4404/1.4435 316LN/1.4406 Where service temperature is &lt;400ºC also 316Ti/1.4571, 316Nb/1.4580</td>
<td>DW316L, DW316LP</td>
</tr>
<tr>
<td>Duplex</td>
<td>Duplex steels S31803/1.4462, S32205/1.4462, S32304/1.4362. Duplex to unalloyed/low alloyed steels Stainless to unalloyed/low alloyed</td>
<td>DW 329A Duplex, DW 329AP Duplex</td>
</tr>
<tr>
<td>Dissimilar joints 13% Cr “Utility stainless” Buffer layer</td>
<td>Stainless steels to unalloyed/low alloyed steels. Ferritic-martensitic stainless steels Buffer layer on unalloyed/low alloyed steels prior to surfacing with Cromacore 308L/LP.</td>
<td>DW 309L, DW 309LP</td>
</tr>
<tr>
<td>Dissimilar joints Buffer layer Hardenable steels</td>
<td>Stainless steels to low alloyed/medium carbon steels Buffer layer on unalloyed/low alloyed steel prior to surfacing with Cromacore 316L/LP. Medium carbon hardenable steels e.g armour plate.</td>
<td>DW 309MoL, DW 309MoLP</td>
</tr>
</tbody>
</table>
# Cored wire data for unalloyed/low alloyed steels

## ELGACORE

<table>
<thead>
<tr>
<th>RUTILE CORED WIRE</th>
<th>Shielding gas</th>
<th>Classification</th>
<th>EN 758</th>
<th>AWS</th>
<th>Yield strength</th>
<th>Tensile strength</th>
<th>Impact energy</th>
<th>CTOD tested</th>
<th>Welding position</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWA 50</td>
<td>Ar+15-25%CO₂</td>
<td>T 4 2 2 P M 1 H₅</td>
<td>E 71T-1M</td>
<td></td>
<td>520</td>
<td>590</td>
<td>75J/-20C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DWX 50</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 4 2 2 P CM 1 H₅</td>
<td>E 71T-1/-1M</td>
<td></td>
<td>540</td>
<td>600</td>
<td>75J/-20C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DWA 52F</td>
<td>Ar+15-25%CO₂</td>
<td>T 4 2 2 R M 1 H₅</td>
<td>E 71T-1M</td>
<td></td>
<td>500</td>
<td>580</td>
<td>65J/-20C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DWA 55E</td>
<td>Ar+15-25%CO₂</td>
<td>T 4 2 4 P M 1 H₅</td>
<td>E 71T-9M</td>
<td></td>
<td>570</td>
<td>630</td>
<td>80J/-40C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DWA 55Ni1</td>
<td>Ar+15-25%CO₂</td>
<td>T 4 6 6 1Ni P 2 H₅</td>
<td>E 81T1-Ni1M</td>
<td></td>
<td>550-510</td>
<td>610-570</td>
<td>75J/-60C (75J/-40C)</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>DWA 55L</td>
<td>Ar+15-25%CO₂</td>
<td>T 4 6 1,5Ni P 1 H₅</td>
<td>E 81T1-K2M</td>
<td></td>
<td>550</td>
<td>620</td>
<td>75J/-60C</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>DWA 55LSR</td>
<td>Ar+15-25%CO₂</td>
<td>T 4 6 1Ni P 1 H₅</td>
<td>E 81T1-Ni1</td>
<td></td>
<td>500-450</td>
<td>570-540</td>
<td>80J/-60C (85J/-46C)</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>DWA 65L</td>
<td>Ar+15-25%CO₂</td>
<td>T 5 5 4 Z P M 2 H₅</td>
<td>E 91T1-K2M</td>
<td></td>
<td>620</td>
<td>690</td>
<td>80J/-40C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DW 588</td>
<td>CO₂</td>
<td>T 5 0 0 Z P C 1 H₅</td>
<td>E 81T1-W2</td>
<td></td>
<td>530</td>
<td>610</td>
<td>50J/-30C</td>
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</table>

## METAL CORED WIRE

<table>
<thead>
<tr>
<th>METAL CORED WIRE</th>
<th>Shielding gas</th>
<th>Classification</th>
<th>EN 578</th>
<th>AWS</th>
<th>Yield strength</th>
<th>Tensile strength</th>
<th>Impact energy</th>
<th>CTOD tested</th>
<th>Welding position</th>
</tr>
</thead>
<tbody>
<tr>
<td>MXA 100</td>
<td>Ar+8-25%CO₂</td>
<td>T 4 2 4 M 3 H₅</td>
<td>E 70C-6M</td>
<td></td>
<td>460</td>
<td>555</td>
<td>80J/-40C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MXX 100</td>
<td>Ar+8-25%CO₂, CO₂</td>
<td>T 4 2 2 M/M C 1 H₅</td>
<td>E 70C-6M/6C</td>
<td></td>
<td>450</td>
<td>570</td>
<td>75J/-29C</td>
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</tr>
<tr>
<td>MXA 100XP</td>
<td>Ar+8-25%CO₂</td>
<td>T 4 6 4 M 1 H₅</td>
<td>E 70C-6M</td>
<td></td>
<td>520</td>
<td>610</td>
<td>80J/-40C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MX 100T</td>
<td>Ar+15-25%CO₂</td>
<td>T 4 2 2 M/M C 1 H₅</td>
<td>E 70C-6M/6C</td>
<td></td>
<td>450</td>
<td>570</td>
<td>60J/-20C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MXX 55T</td>
<td>Ar+15-25%CO₂</td>
<td>T 4 6 6 1Ni M 1 H₅</td>
<td>80C-G</td>
<td></td>
<td>500</td>
<td>580</td>
<td>55J/-60C</td>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>

## BASIC CORED WIRE

<table>
<thead>
<tr>
<th>BASIC CORED WIRE</th>
<th>Shielding gas</th>
<th>Classification</th>
<th>EN 758</th>
<th>AWS</th>
<th>Yield strength</th>
<th>Tensile strength</th>
<th>Impact energy</th>
<th>CTOD tested</th>
<th>Welding position</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWA 51B</td>
<td>Ar+15-25%CO₂</td>
<td>T 4 2 2 B M 1 H₅</td>
<td>E 71T-5MJ</td>
<td></td>
<td>490-420</td>
<td>600-530</td>
<td>100J/-20 (100J/-20)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# Cored wire data for stainless steels

## CROMACORE

<table>
<thead>
<tr>
<th>RUTILE CORED WIRE</th>
<th>Shielding gas</th>
<th>Classification</th>
<th>EN 12073</th>
<th>AWS</th>
<th>Yield strength</th>
<th>Tensile strength</th>
<th>Impact energy</th>
<th>Ferrite level</th>
<th>Welding position</th>
</tr>
</thead>
<tbody>
<tr>
<td>DW 308L</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 1 9 12 L R M/C 3</td>
<td>E 308LT0-4/-1</td>
<td></td>
<td>400</td>
<td>570</td>
<td>43J/-20C</td>
<td>FN 6</td>
<td></td>
</tr>
<tr>
<td>DW 308LP</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 1 9 12 L P M/C 1</td>
<td>E 308LT1-4/-1</td>
<td></td>
<td>400</td>
<td>590</td>
<td>40J/-20C</td>
<td>FN 9</td>
<td></td>
</tr>
<tr>
<td>DW 316L</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 1 9 12 3 L R M/C 3</td>
<td>E 316LT0-4/-1</td>
<td></td>
<td>410</td>
<td>570</td>
<td>40J/-20C</td>
<td>FN 9</td>
<td></td>
</tr>
<tr>
<td>DW 316LP</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 1 9 12 3 L P M/C 1</td>
<td>E 316LT1-4/-1</td>
<td></td>
<td>430</td>
<td>600</td>
<td>40J/-20C</td>
<td>FN 9</td>
<td></td>
</tr>
<tr>
<td>DW 329A Duplex</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 2 2 9 3 N L R M/C 3</td>
<td>E 2290T0-4/-1</td>
<td></td>
<td>610</td>
<td>800</td>
<td>40J/-20C</td>
<td>FN 40</td>
<td></td>
</tr>
<tr>
<td>DW 329AP Duplex</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 2 2 9 3 N L P M C 1</td>
<td>E 2290T1-4/-1</td>
<td></td>
<td>610</td>
<td>800</td>
<td>42J/-46C</td>
<td>FN 40</td>
<td></td>
</tr>
<tr>
<td>DW 309L</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 2 3 12 L R M/C 3</td>
<td>E 309LT0-4/-1</td>
<td></td>
<td>460</td>
<td>590</td>
<td>38J/-20C</td>
<td>FN 14</td>
<td></td>
</tr>
<tr>
<td>DW 309LP</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 2 3 12 L P M/C 1</td>
<td>E 309LT1-4/-1</td>
<td></td>
<td>460</td>
<td>590</td>
<td>38J/-20C</td>
<td>FN 14</td>
<td></td>
</tr>
<tr>
<td>DW 309MoL</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 2 3 12 2 L R M/C 3</td>
<td>E 309LMoT0-4/-1</td>
<td></td>
<td>540</td>
<td>710</td>
<td>29J/0C</td>
<td>FN 22</td>
<td></td>
</tr>
<tr>
<td>DW 309MoLP</td>
<td>Ar+15-25%CO₂, CO₂</td>
<td>T 2 3 12 2 L P M/C 1</td>
<td>E 309LMoT1-4/-1</td>
<td></td>
<td>540</td>
<td>710</td>
<td>29J/0C</td>
<td>FN 22</td>
<td></td>
</tr>
</tbody>
</table>

### Typical mechanical properties

- **Yield strength** in MPa
- **Tensile strength** in MPa
- **Impact energy** in J
- **Ferrite level**
- **Welding position**