

2018-II

STARCO Wheel manufacturing





STARCO – a Kenda company

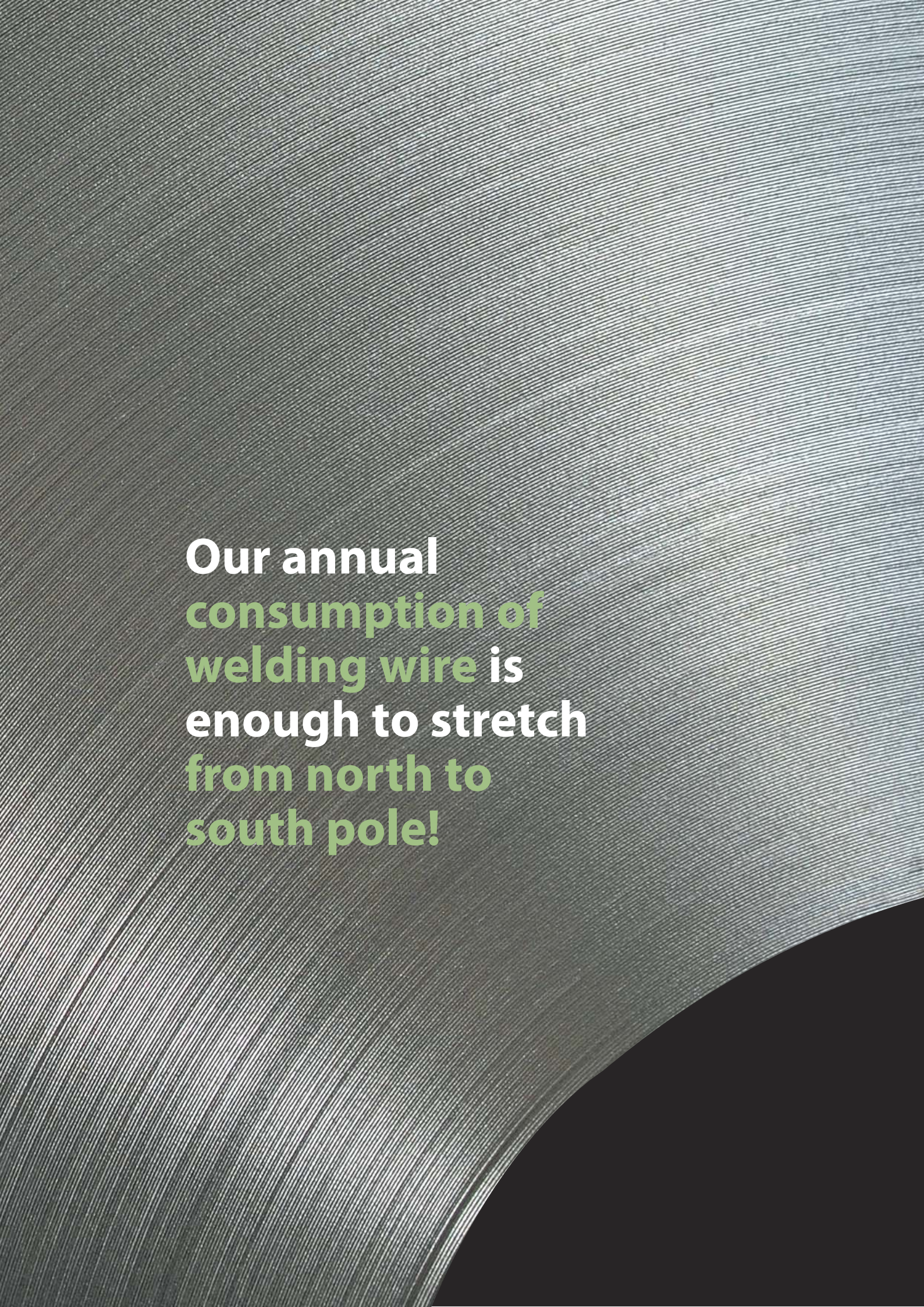
STARCO has been a pioneering force in the wheel and tyre industry for more than 55 years. Today, 550 STARCONians make up a great team bound by a passion to develop, manufacture and deliver clever wheel solutions. STARCO's specialty is low and high volume standard and bespoke complete wheels for a wide range of applications – from the smallest wheelbarrow or trailer, to large agricultural or industrial machines and implements.

With factories in the UK, Croatia and China, as well as eight sales and distribution locations across Europe, STARCO has a widespread distribution network. STARCO is a part of the Kenda Group that is one of the world's leading tyre and tube manufacturers with factories all over the world and 11,000 employees globally.

[Learn more at starco.com](https://www.starco.com)

If we stacked
a month's
production of
wheels on top of
one another, the pile
would be taller than
Mount Everest!

We spray enough
paint every day onto
our wheels to cover
11 tennis courts!



**Our annual
consumption of
welding wire is
enough to stretch
from north to
south pole!**



Rim profiles

STARCO's spinning process allows for superb flexibility of rim profiles with easy switching between W, DW and asymmetric profiles. This means the range has a rim suited to for every application.

Rim

STARCO rims are engineered to ETRTO norms. STARCO rims provide the basis for any possible wheel solution.



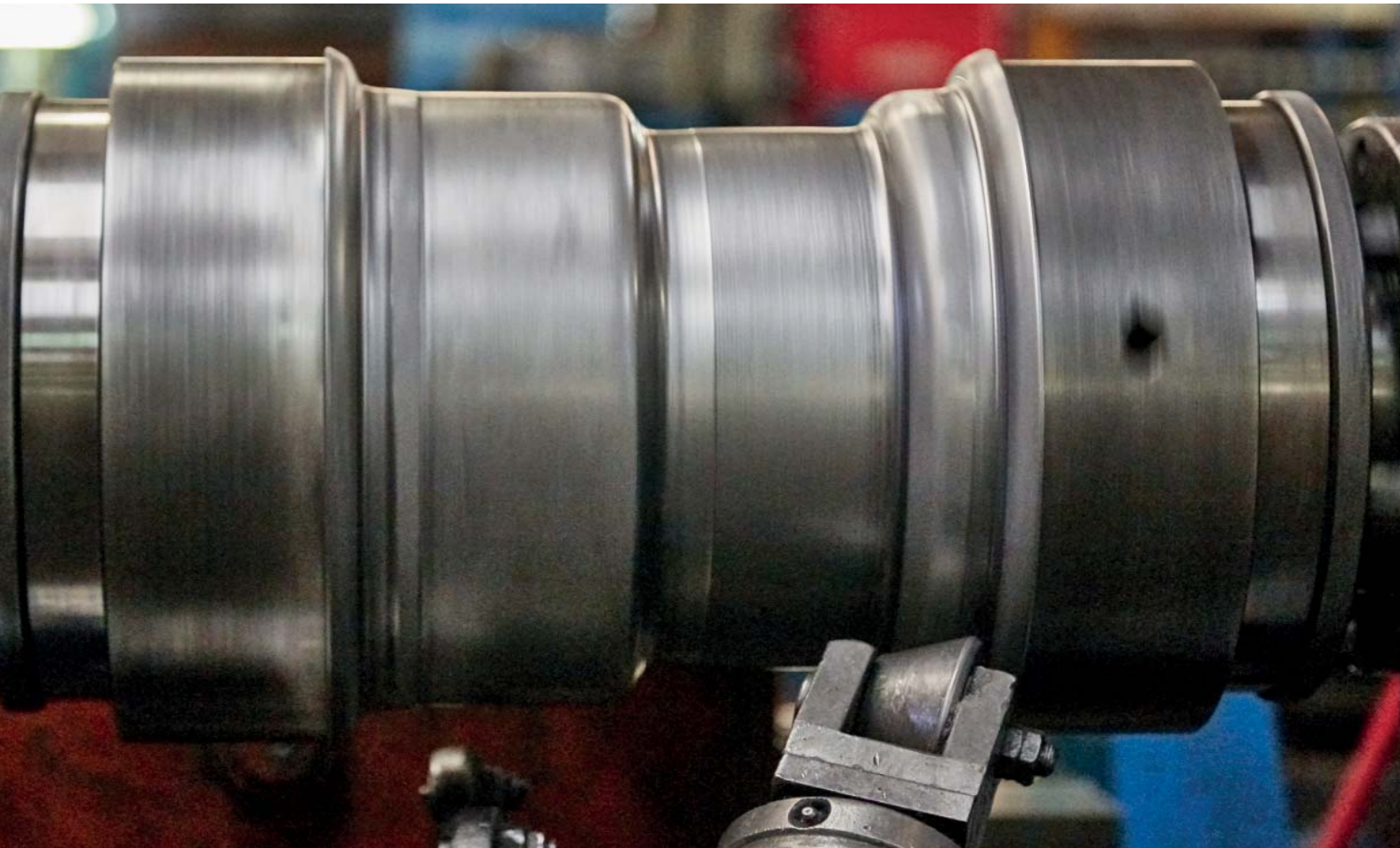
Disc

With our in-house disk design, tooling and manufacturing we support the complete requirement of discs within our product portfolio.

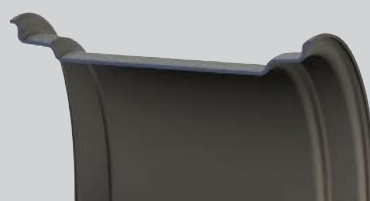


Wheel

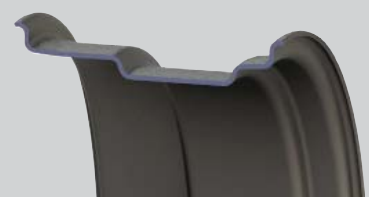
With full control of the rim and disc process, STARCO wheels have the highest standard for its purpose, making us the leading wheel manufacturer.



DW symmetric profile



W symmetric profile



W asymmetric profile



Horn

The horn is essential in providing the strength to any wheel. STARCO takes special care in this area of the rim and has developed processes that help maintaining maximum material thickness to enhance the design strength.



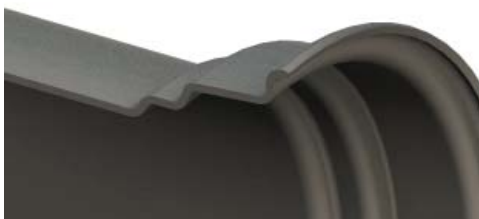
Horn on rolled wheels



Welding of horn reinforcement



Standard horn



The standard flange horn has a large rolled over edge, providing good strength and easing tyre fitment.

Horn reinforcement



For really heavy or tough applications such as Forestry, STARCO offers rims with horn reinforcement straight from the factory. These rims are significantly strengthened with a welded ring around the inside of the horn.



Humps

Humps are a safety feature designed to prevent the bead of the tyre dropping into the wheel well during sudden deflation. As the tyre bead is retained, lower running pressures can be used.



Bead retention humps

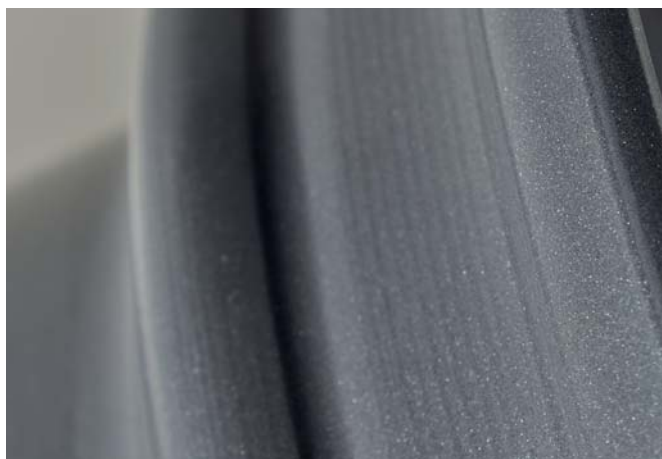
- ▶ Wheels from STARCO are the only in the market with humps in rolled 8", 9" & 10"
- ▶ All pressed wheels for Agricultural and Industrial are provided with humps
- ▶ All rims from STARCO are with humps on one or both sides
- ▶ The STARCO humps are clearly defined, keep the tyre safely seated, improve stability, less risk of damage caused by sudden deflation
- ▶ The humps ensure tight fitment, giving the possibility to run at very low inflation pressure



H1



H2



Horn



Quality check of horn



Plug fit disk - installed



Plug fit disc - pressed in



Plug fit disc - welding

Disc

STARCO makes all discs in-house. This ensures full control of material, form and fitment optimized for STARCO rims.





Our squared disc



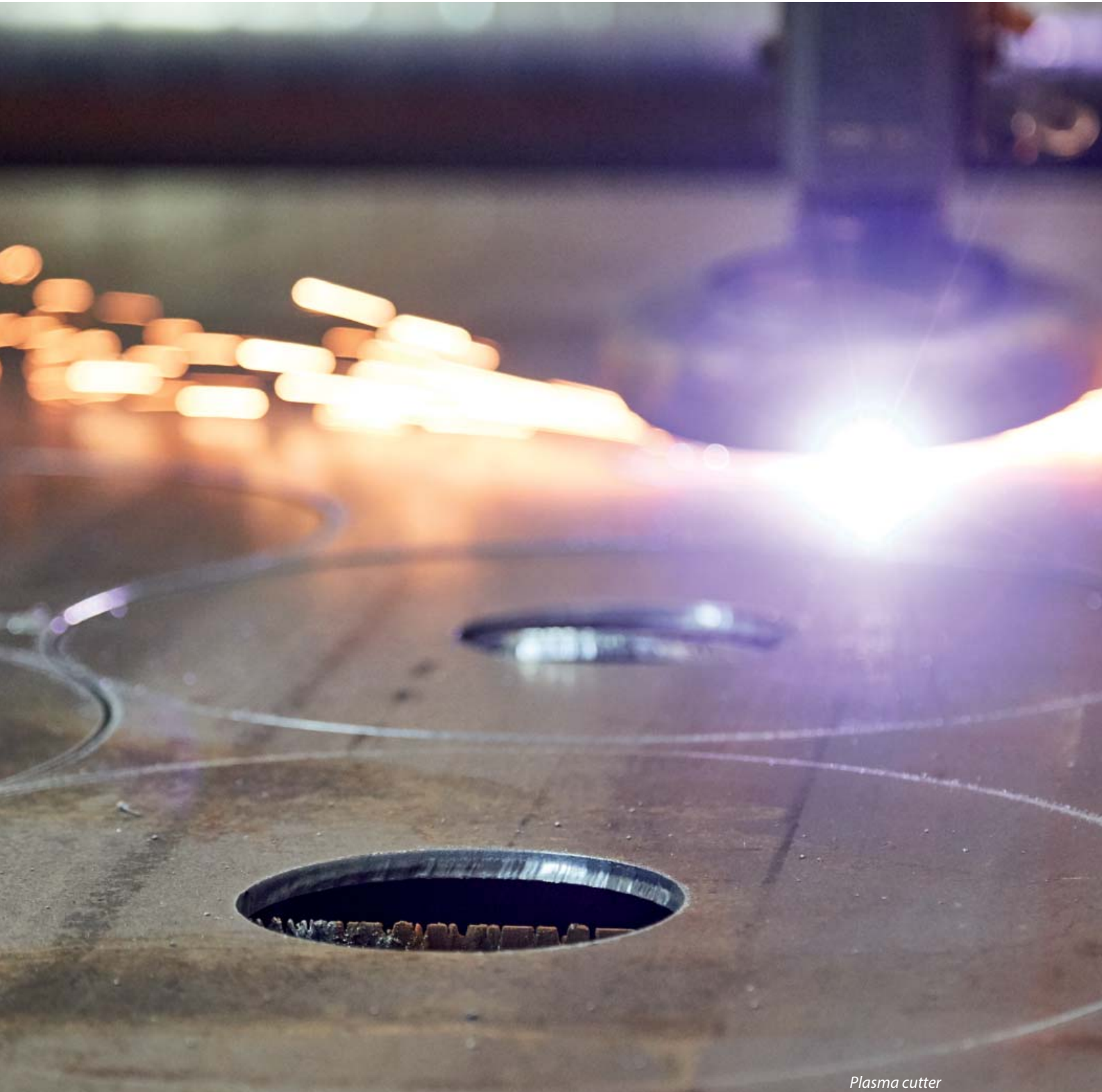
The flat disc



Our plug Fit disc



Deep plug fit disk



Plasma cutter



Stud hole

Plain seat

This method produces the strongest seat, as no material is removed. Being pressed rather than machined, indeed the compression of the metal makes it harder and stronger. Countersink can be conical or spherical.



Puching and forming...step 1



Step 2



Step 3

The wheel can be centered by a close fit to the spigot of the hub or by the wheel nuts seated into a countersunk stud hole.

When plain stud holes are used, this is called Spigot Fixing or Hub Centering Wheel Fixing. Wheel fixing with countersunk holes is often referred to as Bolt Centering Fixing.

Flexible production setup, stud holes, bores, seating etc. can be produced to match customers' requirements.



Plain seat

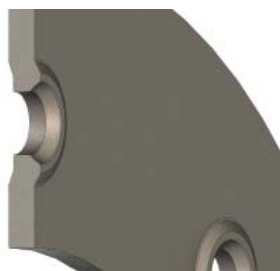
- ▶ The bore of the wheel fits very closely to the hub spigot and the wheel centers itself



Plain seat

Spherical Countersink

- ▶ The countersink stud hole design centers the wheel and keeps it in position.
- ▶ The spherical countersink is expressed as a radius, e.g. R16 (radius of 16 mm).
- ▶ The conical countersink is expressed as an angle e.g. 60°.



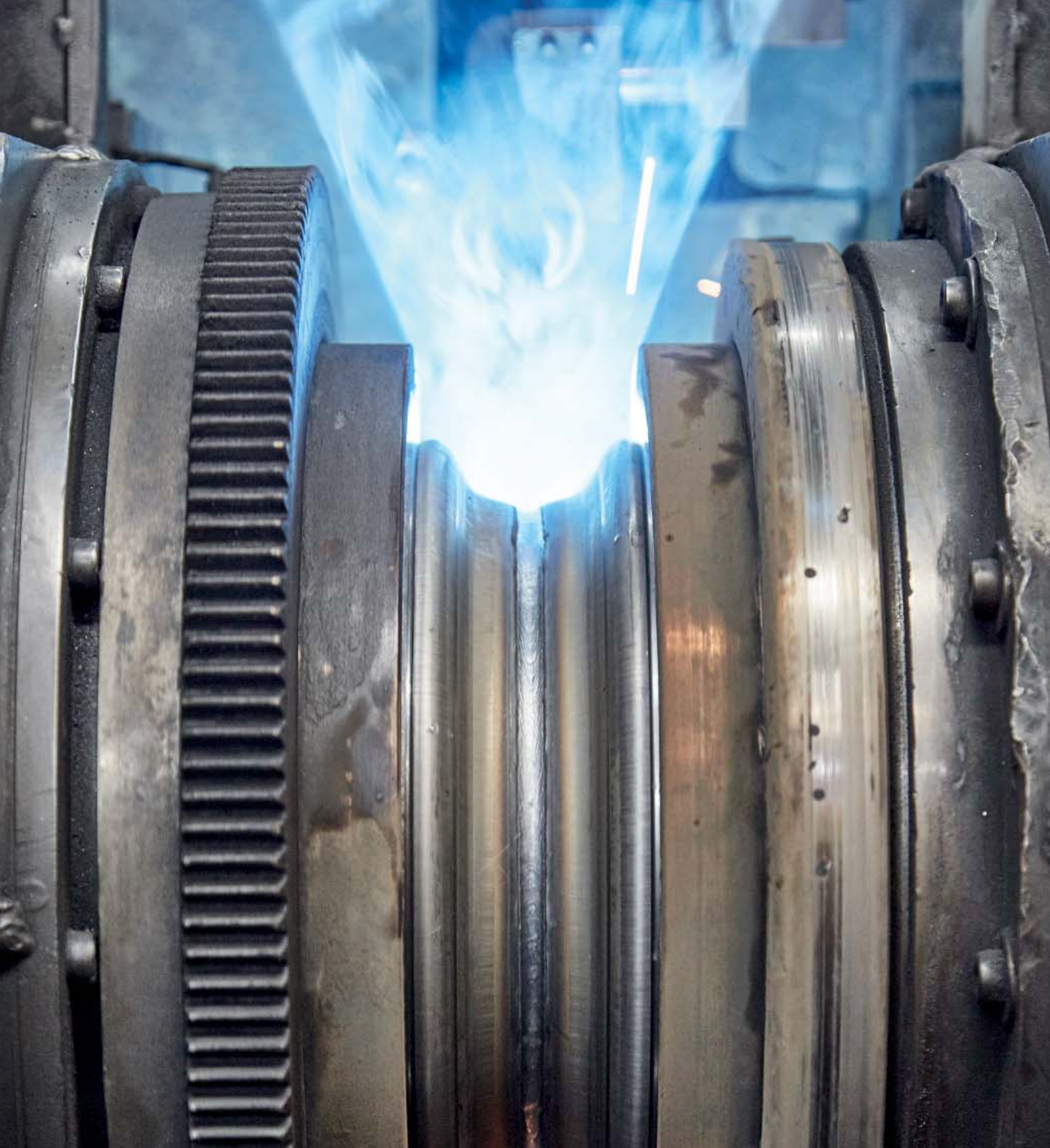
Spherical countersink

Conical Countersink

- ▶ British Standard / Imperial Standard.
- ▶ The shape of the countersink is expressed in degrees, the most popular being 90°, 80° and 60°. E.g. with C90 (90°)



Conical countersink



Integral wheels

STARCO's pressed wheel range includes a wide range of possible integral hub configurations – enabling us to supply wheels for almost any thinkable axle fitment and application.



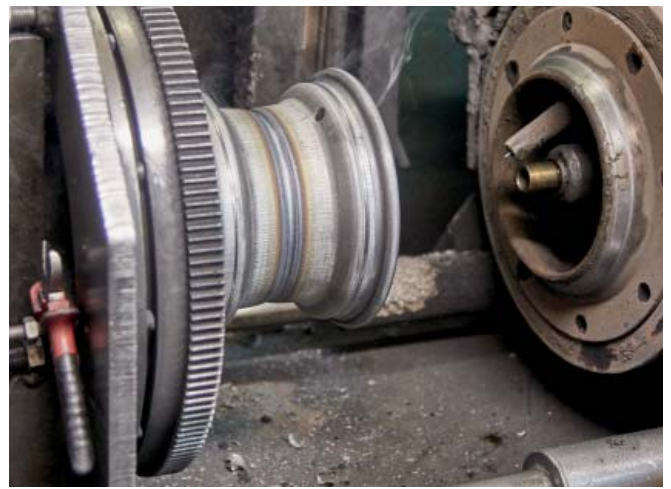
First form



Second form



Hump and horn forming



Welding (cold metal transfer)

The pressed wheel

- ▶ In-house tooling department for unique wheel design
- ▶ Flexible capacity for efficient high volume production
- ▶ Special welding process for optimal production flow



First form



Second form and data stamp



Horn form & punch



Hub position

Integral wheels can be produced either for Central Hub Fitment or for Offset Hub Fitment. The difference lies in the position of the hub and the method of attaching the wheel to the axle.

Wheels with integral hub

The construction of these wheels includes a tube welded into its centre. Bearings are fitted into this tube, which guarantees smooth operation with suitable load carrying ability. There are a wide range of bearing specifications with different bore diameters and load characteristics dependent on the application.



Flange ball bearing



Nylon bush



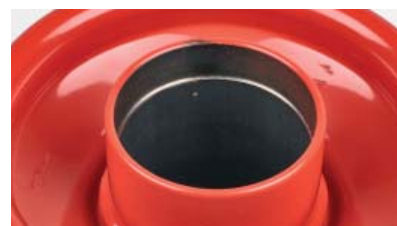
Roller bearing



Plain hub



Ball bearing (nipped seating)



Ball bearing (machined seating)



Press-in key



Standard keyway



Grease nipple



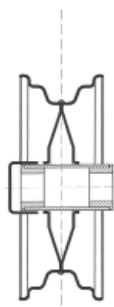
Screw-in cap



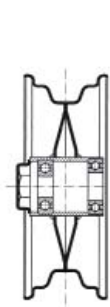
Press-in cap



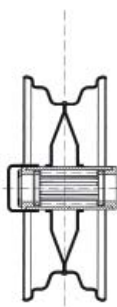
Axle for mouting



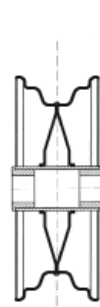
EG·EO



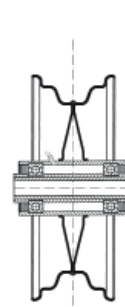
EK



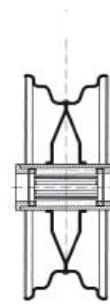
ER



GG·GO



GK



GR



Paint systems



Beauty is more than skin deep - every wheel from STARCO shines

- ▶ Special pre-treatment steps providing excellent paint adhesion
- ▶ E-coat and powder paint lines for small and medium sized wheels
- ▶ Ultra high solids wet paint technology for larger wheels and dual systems
- ▶ Good edge coverage with excellent corrosion protection

All paint systems are installed for maximum flexibility with quick change over between production batches - making any color possible.





Our choice of material



In STARCO we do not compromise on quality

We have developed long term relationship with key suppliers. With a mutual understanding of the complete supply chain, materials of the right quality are always available from our sourcing partners.



A close-up photograph of a dark grey metal wheel. The wheel has a central circular hole and a raised outer rim. Embossed on the surface of the wheel are the words "STARCO" in a large, bold, sans-serif font, and the number "0814" in a smaller font below it. The lighting creates highlights and shadows that emphasize the texture and contours of the metal.

STARCO

0814

Traceability

All wheels from STARCO are identified with a code

- ▶ STARCO wheel identification, with our logo
- ▶ Clear marking of wheel dimensions and safety information
- ▶ Date stamping for easy traceability

2.50A x 8

MHS

MAX 2.0 BAR 30 PSI

Quality makes the difference





- ▶ Continued development of world class manufacturing processes
- ▶ Key product parameters are verified regularly
- ▶ Ongoing investment in the best training of all employees



STARCO wheel manufactures are ISO 9001 & ISO 14001 certified



Paint chemical quality test



Verification of key dimensions

