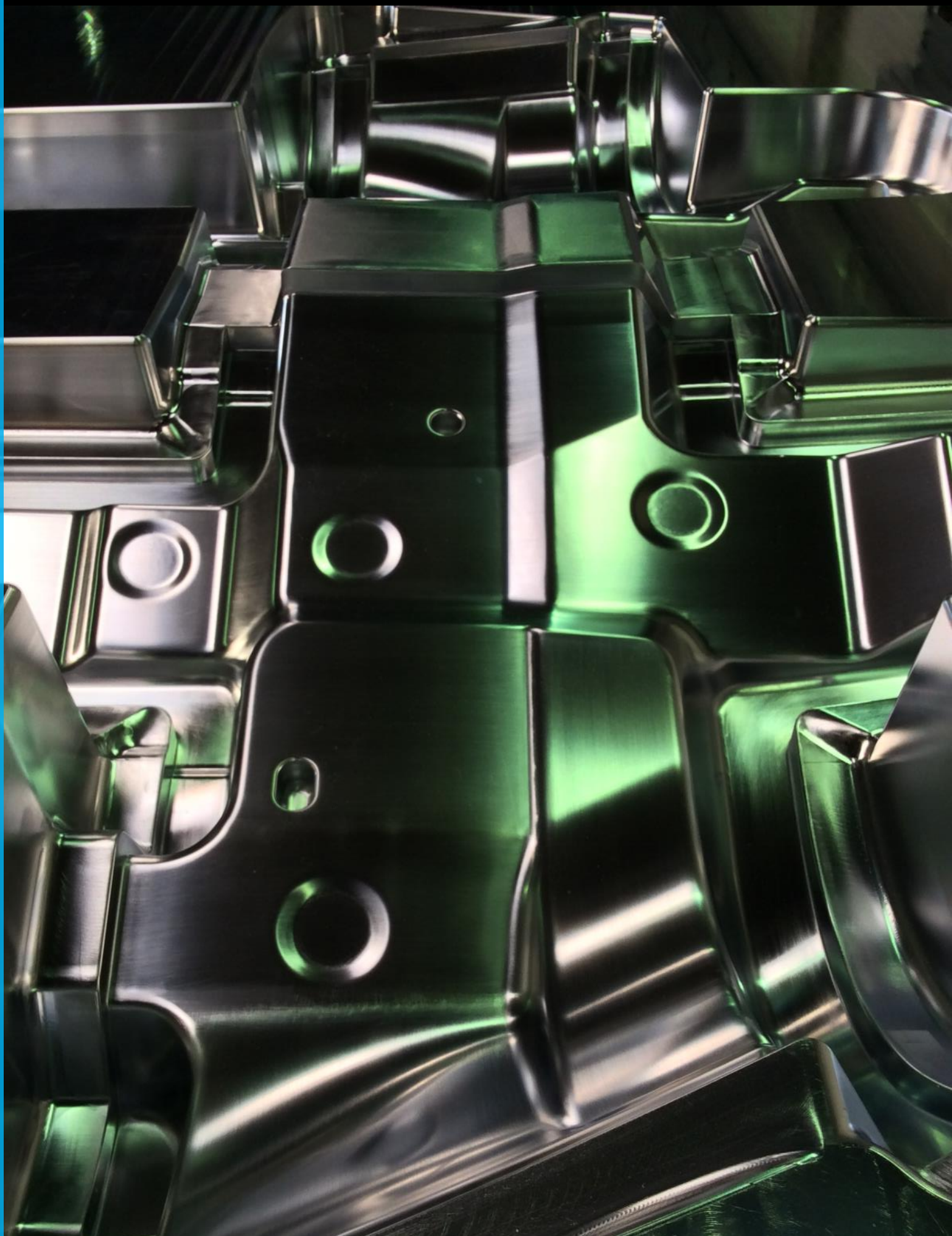
company introduction

SURFACETEC



30,000 S.F. OPERATING FLOOR

20 TON CRANE BAY

LARGE CAPACITY PLATING BATHS

CUTTING EDGE HIGH SPEED
HARD CHROME CHEMISTRY

4 ELECTROLESS NICKEL PROCESSES

TWO 10 TON CRANE BAYS

TECHNICAL SURFACE POLISHING TO S.P.I./S.P.E. STANDARDS

LOCATION AT MIDWEST TRANSPORTATION HUB

METAL SURFACING TECHNOLOGIES

SURFACETEC is a full service company specializing in industrial metal finishing and surfacing technologies.

- industrial hard chrome plating
- electroless nickel coatings
- technical surface polishing to S.P.I./S.P.E. standards

Cr (hard)

EN-Boron

EN-Teflon

EN-P mid/EN-P low

S.P.I. A/B/C/D

SERVING A RANGE OF MARKETS

Since our inception in 1997, we have established long-term relationships with leading OEM's, industrial firms, and contract manufacturers serving a variety of correlated market sectors, with particular emphasis in applications for the automotive and medical device markets. We also work with manufacturers that utilize large-scale tools in markets such as building materials, plumbing fixtures, and personal sport vehicles. Injection molds for consumer packaging and cap & closure applications also represent a large contingent of our work.

automotive

medical

consumer goods

electronics

packaging/caps/closures

building materials

aerospace

NOVEL AND EMERGING

The current manufacturing environment is an exciting one. With the adoption of new technologies and processes related to tool and component production, we have adapted our operation and skillset over time to constantly be prepared for change. We have developed expertise utilizing novel and emerging technologies including applications related to structural composites, thin-wall packaging, and metal additive manufacturing (MAM). In 2015, we began R&D on how our plating and polishing processes can be effectively applied in MAM produced components utilizing a variety of powdered metal media types. In 2016, we extended this research to practical applications for mold and tool builders utilizing MAM for small components and micro-molds.

structural composites

thin-wall injection molding

metal additive manufacturing

A BREADTH OF EXPERTISE

Our production capabilities and technical expertise encompass the application of engineered surface coatings and technical metal polishing over a wide range of metal component and tool types, from the most delicate micro-parts to large-scale tools up to 20 tons. Through listening to our customers and getting to know their needs, we have found that an experience-based comprehension of market segment and end-use for each project is crucial. These specifics allow us to tailor each process in a wider context. A 10 ton injection mold for an OEM automotive component may have distinct requirements in comparison to a 10 ton injection mold for an FRP plumbing fixture even though the finish specifications may be equivalent. Parameters such as press type, resin type, operating temperatures, and shot rates are all crucial inputs.

- precision plastic injection molds
- automotive component molds and dies
- medical device & DDS component molds
- compression molds
- pultrusion and extrusion dies
- micro-molds and micro-parts
- stamping dies
- precision fasteners
- optics and reflectors

MORE THAN JUST COMPETENT

With an average of 15 years experience, our technicians share a strong background in tooling and production, and are proficient in a range of coating and plating processes as well as manual polishing methods that consistently exceed industry standards. Our core supervisory team has worked with the company for nearly 20 years and is OSHA certified. Our facility leverages these human capabilities and applies them with efficiency with two shift schedule and readiness 24/7. Although our workshop teams typically perform project work in-house, our scope goes beyond the shop and extends to customer facilities for on-site tool maintenance and production run testing for tool verification.

- 15 years average technician experience
- OSHA certified supervisory team
- 2 shift shop schedule
- 24/7 operation
- on-site capability
- emergency maintenance for critical tools

ALIGNED WITH EFFICIENCY

We realize our vital role as a link in many supply chains and are committed to efficiency and systematic workflow management in all dimensions. Like most of our customers and supply chain partners, we utilize principles drawn from efficiency paradigms such as LEAN Manufacturing, Kaizen, and Six Sigma. Diligent production planning and management ensures that project flow is consistent and efficient throughout each phase. We have an affinity for the critical schedules of each customer and are ready to meet crucial deadlines and assist with emergency repair and maintenance for mission critical tools.

改善

KAIZEN

6σ

DEFINE
MEASURE
ANALYZE
CONTROL

OUR MOST IMPORTANT TOOL

Our 30,000 s.f. suburban Chicago facility is more than simply a building and land; it is a vital tool designed to handle a range of project scales from microscopic to massive. Completed in Q3 2013, our facility provides substantial capacity to our plating, coating, and polishing operations with dedicated capacities for large scale projects.

- 20 ton overhead crane bay
- two 10 ton overhead crane bays
- 5 ton overhead crane bay
- 30,000 s.f. operating floor
- large capacity hard chrome baths
- high throughput nickel lines
- interior truck dock
- secured premises

DESIGNED FOR CAPACITY

Combining a 20 ton crane bay with one of the largest hard chrome operations in the region means automotive and heavy equipment OEM's, tier suppliers, and tool builders can rely on us for their large-scale production tools. Marine craft and plumbing fixture manufacturers also utilize our capacity for their large scale tools for fiberglass compression molding.

CLEANER THAN EVER

Our hard chrome plating process lines utilize a state of the art control system for airborne emissions that exceeds Federal and State EPA requirements, and also exceeds stringent California emissions standards. This tiered multi-stage HEPA filtration system is designed to effectively remove process contaminants and re-circulate purified air back to the workshop area in a closed loop with no discharge to the outside atmosphere.

AT THE CENTRAL HUB

Our location at the Midwest hub of national logistics networks provides a variety of transport possibilities, increasing logistical efficiency. We provide secure pickup and delivery at customer facilities throughout the U.S., Canada, and Mexico. Our direct adjacency to O'Hare International Airport effectively extends our reach beyond North America.

HARD CHROME PLATING

At 68 to 72 HRc, our high speed Hard Chrome process yields functional deposits with excellent micro-hardness values along with advanced micro-crack structures for significantly enhanced anti-corrosion properties when compared to typical fluoride additive and conventional chromium processes.

Designed for highly demanding industrial applications such as locomotive engines, mining equipment, and heavy stamping dies, our high speed Hard Chrome chemistry yields one of the hardest functional deposits currently available with very high sliding wear and dry abrasive wear performance, and is ideal for injection molds, compression molds, and pultrusion & extrusion dies where efficient release throughout the production lifecycle is critical.

Our large capacity HEEF bath is sized for components up to 20 tons with tank size of:

12'-0" long x 8'-0" wide x 6'-0" deep

Our small & medium capacity HEEF baths are sized for components up to 10 tons with tank sizes of:

5'-0" long x 3'-0" wide x 3'-6" deep
3'-0" long x 3'-0" wide x 3'-6" deep

ANODE FABRICATION

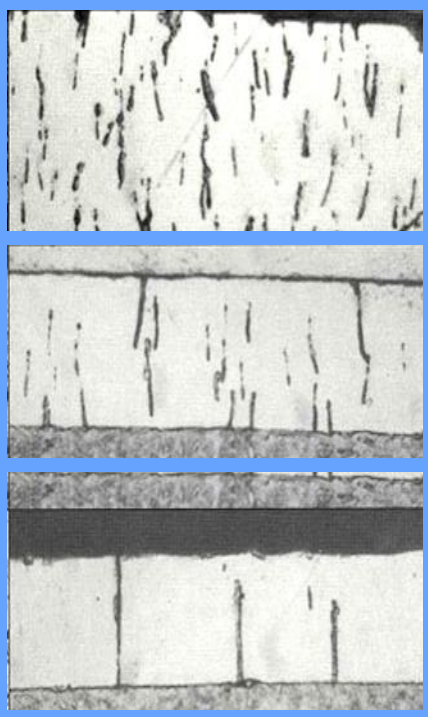
One of the most critical and esoteric aspects of the hard chrome plating process is the fabrication of conforming anodes. Each component requires a custom fabricated anode designed to conform to the component's specific geometry. Only a proficiently crafted anode can yield uniform chrome disbursement and reliably consistent deposit thickness over the plated surface. Our master anode technician has over 25 years of experience with over 5,000 conforming anode fabrications completed.

MICRO-CRACK STRUCTURE COMPARISON

SURFACETEC

fluoride additive

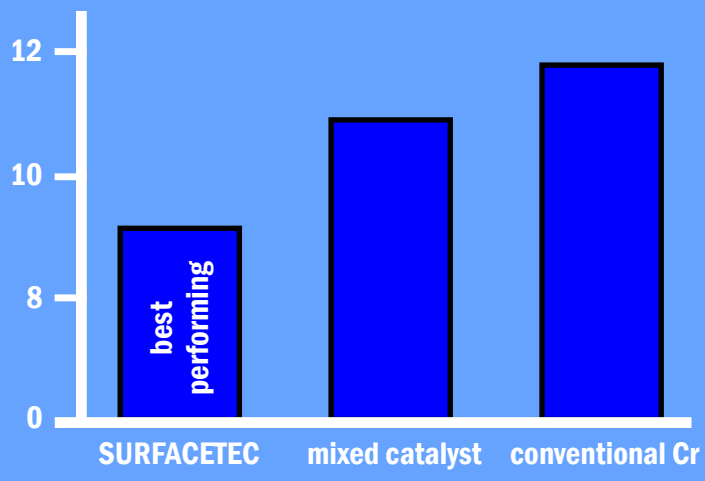
conventional Cr

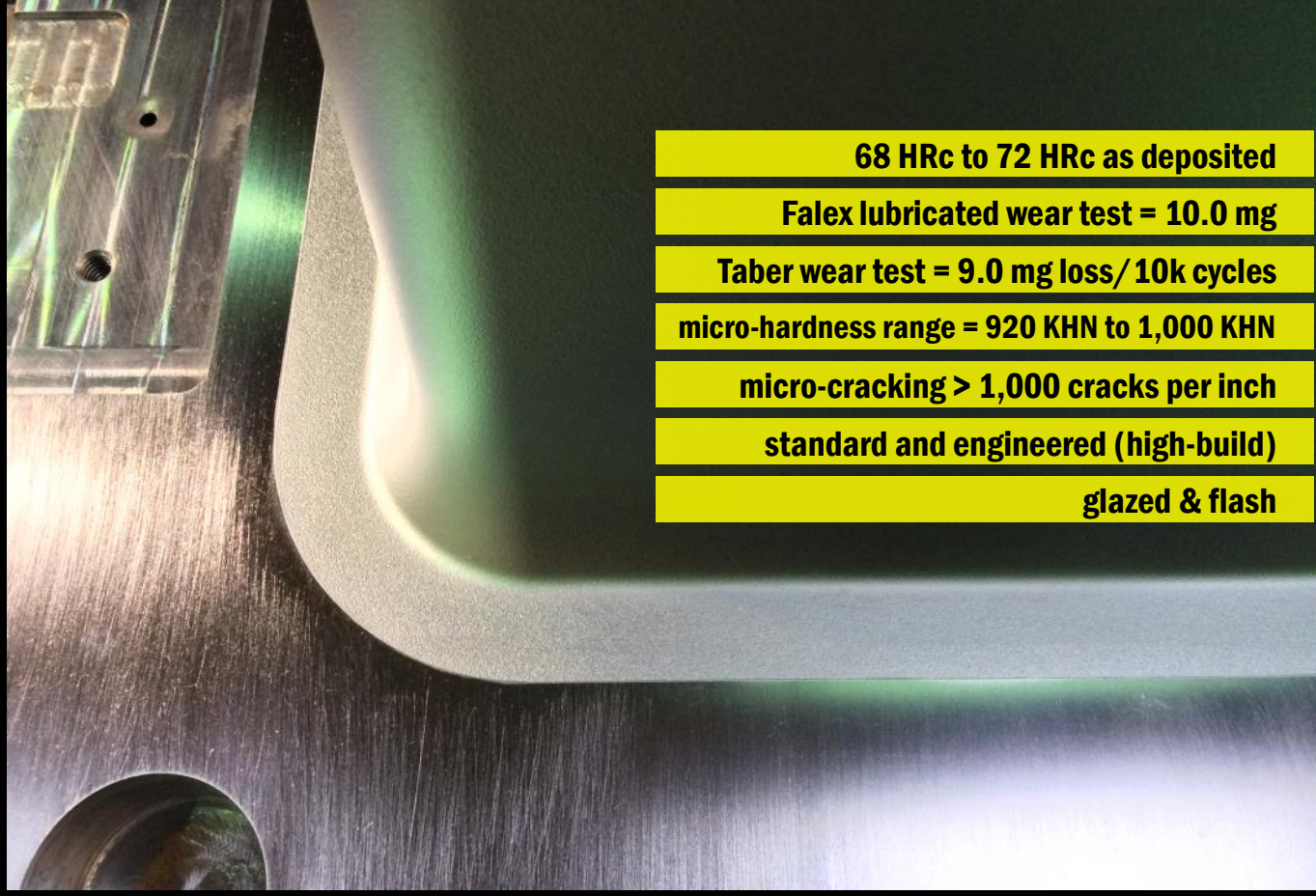


cross section photomicrographs of micro-crack structures indicate that Surfacetec hard chrome deposits exhibit high quantities of micro-cracks which are shallow, narrow, and densely dispersed, resulting in reduced corrosion compared to other chrome deposit types with fewer, deeper, and more widely dispersed micro-cracks which extend from the wearing surface to plating substrate, providing potential for corrosion pathways to base metal

WEAR PERFORMANCE COMPARISON

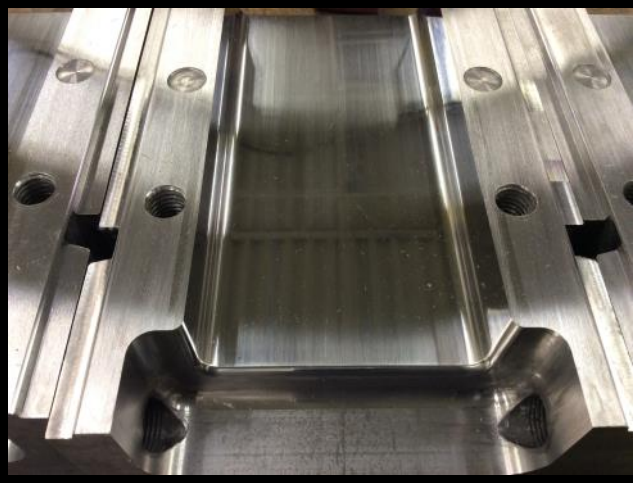
Taber Abraser Wear Test (mass loss in mg/10k cycles)



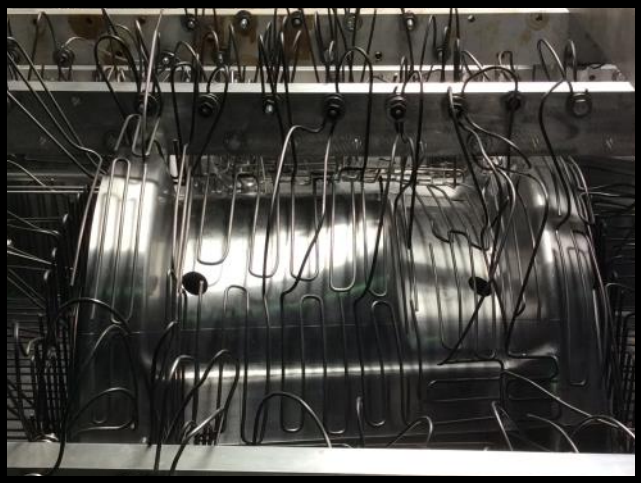


precise alignment of hard chrome edge with edge of textured surface

compression mold with stiffening ribs



pultrusion die



anode assembly conforming to complex geometry

injection mold with varying surface texture

ELECTROLESS NICKEL COATINGS

Our electroless nickel lines are capable of handling a wide range of project scales with individual tank size of:

3'-0" long x 2'-0" wide x 3'-0" deep

nickel boron

low temperature application
51 HRc as deposited
68 HRc after heat treatment
maximized dry film lubricant properties
COF = <0.1
excellent wear and corrosion resistance
operating temperature up to 1,250 degrees F

nickel Teflon®

electroless Nickel Teflon® (PTFE) codeposit
28 HRc as deposited
34 HRc after heat treatment
high lubricity with COF = 0.1 to 0.2
deposits contain 20% to 25% PTFE
dry film lubricant + non-wetting properties
good wear resistance and release properties
RoHS compliant deposit

mid phosphorus nickel

bright
6% - 8% P
45 to 51 HRc as deposited
64 to 71 HRc after heat treatment
RoHS compliant deposit

low phosphorus nickel

bright
4% - 6% P
53 to 59 HRc as deposited
64 to 68 HRc after heat treatment
good corrosion resistance
RoHS compliant deposit
uniform deposit up to 0.001"

Teflon is a registered trademark of E.I. du Pont Nemours and Company

TECHNICAL SURFACE POLISHING

Technical polishing of industrial metal surfaces is truly an esoteric craft... we believe it is best done by human hands, with human ability and skill.

While we seek out advances in metal polishing technology such as automated and robotic systems, we continue our focus on manual polishing methods and believe the most consistent results are achieved through human perception and judgement, which most automated systems have yet to reliably replicate.

Our polishing team is proficient in all relevant techniques that meet or exceed industry standards including optical diamond lapping and microscopic polishing. We are able to consistently hold tolerance within 0.0003".

S.P.I. A diamond finishes

- A-1 grade #3 diamond buff
- A-2 grade #6 diamond buff
- A-3 grade #15 diamond buff

S.P.I. B paper finishes

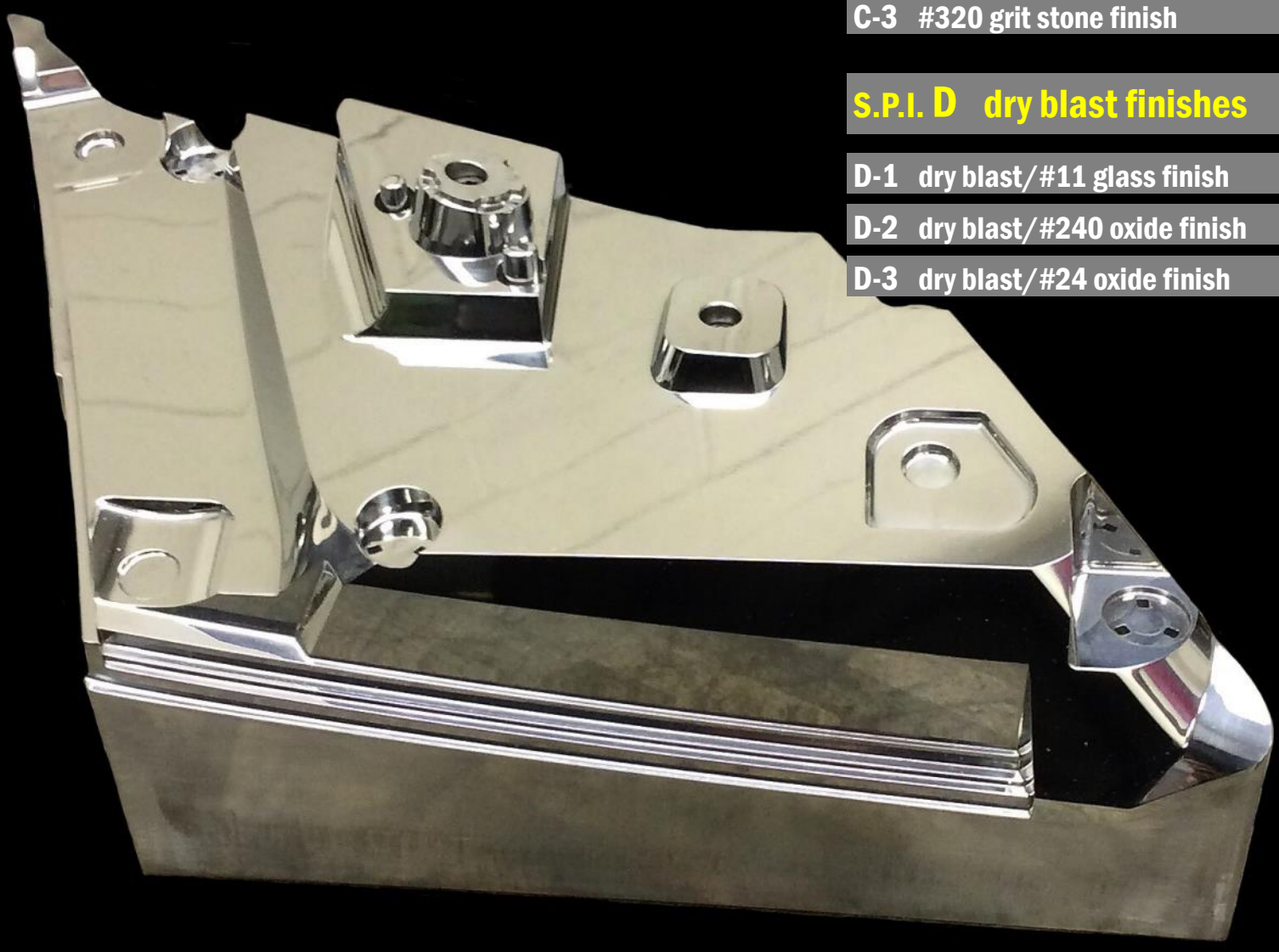
- B-1 #600 grit emery paper
- B-2 #400 grit emery paper
- B-3 #320 grit emery paper

S.P.I. C stone finishes

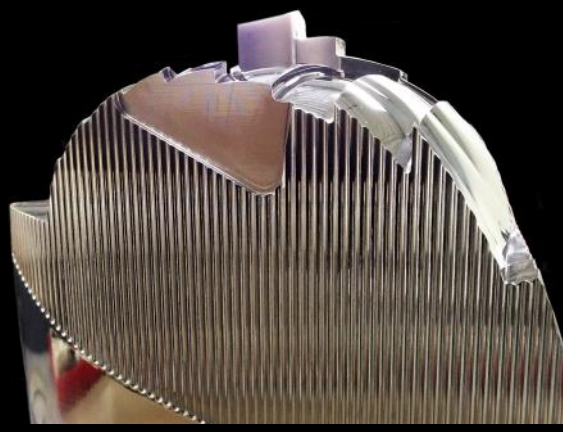
- C-1 #600 grit stone finish
- C-2 #400 grit stone finish
- C-3 #320 grit stone finish

S.P.I. D dry blast finishes

- D-1 dry blast/#11 glass finish
- D-2 dry blast/#240 oxide finish
- D-3 dry blast/#24 oxide finish



AUTOMOTIVE



Surfacing of molds and dies for the automotive industry is one of our areas of expertise and proficiency developed through years of experience and encompassing a range of applications including lighting, interior trim, structural components, and composites.

An experience-based comprehension of the specific finishing needs for these types of tools is crucial in order to ensure efficient release over a maximum production cycle, especially for lighting applications involving chrome plated plastic components.

We've established relationships with well known OEM's and tier suppliers throughout the U.S., and are ideally located to support marquee assembly facilities in Michigan and Indiana.

MEDICAL DEVICE

Surfacing of tools for the medical device & drug-delivery system (DDS) market is another of our areas of emphasis and particular expertise developed through years of experience working with tools for a broad range of applications.

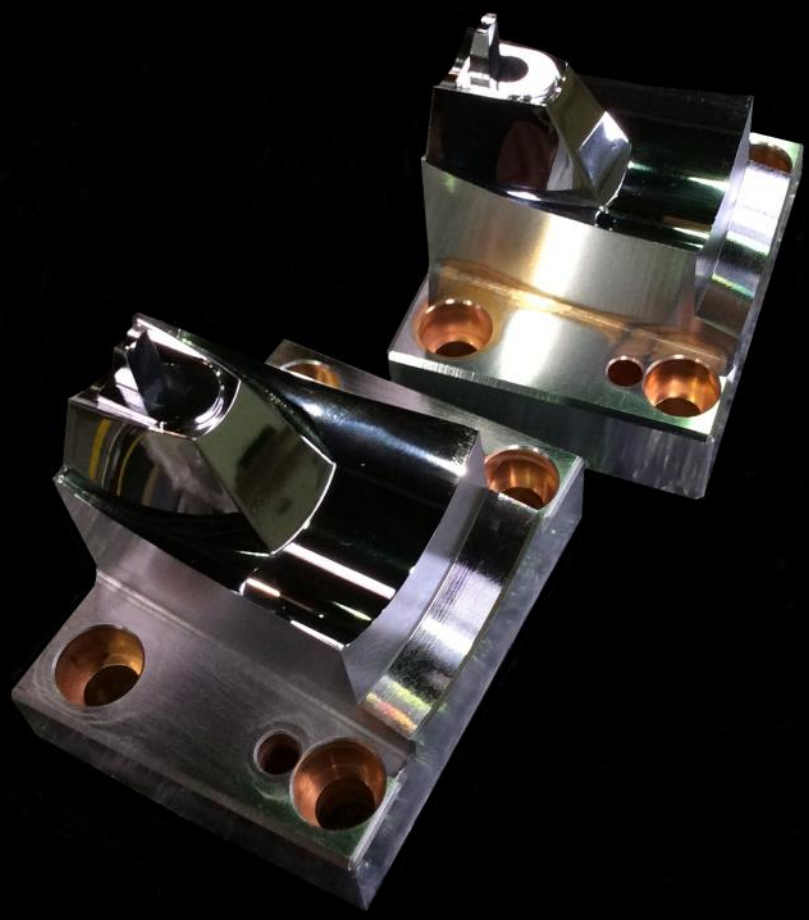
As with the automotive segment, a comprehension of the specific finishing needs for the medical device segment is critical in order to ensure tight tolerance holding, shape retention, and surface finish integrity throughout repeated maintenance cycles. We also understand the specific surfacing requirements for a variety of molding media including low friction medical-grade polymers and biodegradables.

We have developed relationships with medical device producers, OEM's, and contract manufacturers throughout the U.S., with many of our customers drawn from medical manufacturing and technology centers in California and Arizona.

SMALL SCALE

While our capacities enable us to work with large tools up to 20 tons, small-scale work is at the historical core of our business. A large part of our work continues to focus on small-scale and micro-scale tools for medical, aerospace, and electronics applications. Work at these scales often requires tolerances be held at microscopic levels of detail.

Complex geometries critical to end-use function must be maintained throughout the finishing process. This requires a thorough understanding of the component's external and internal form and geometry, as well as the component's base metal properties and how they are affected by various polishing media and plating chemistries.

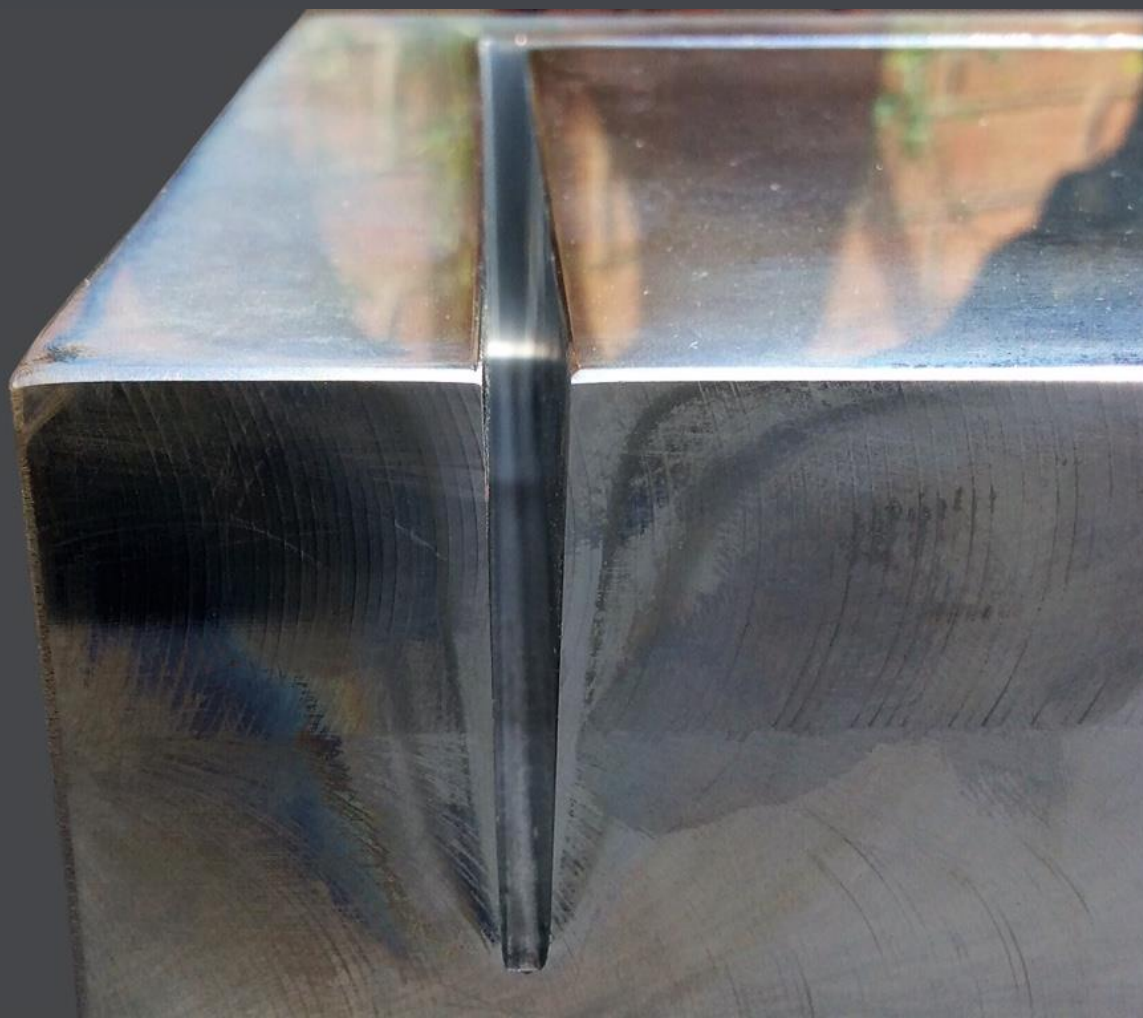


R&D

While we undertake R&D related to emerging technologies such as additive manufacturing, we more often begin R&D to address a particular issue or challenge raised by a customer.

One such R&D study addressed hard chrome application in deep grooves commonly found in compression mold tooling where stiffening ribs are integrated in the final component. These deep grooves typically pose a challenge to injection molders since a lack of uniform chrome deposits within the grooves can lead to release failures far ahead of the tool's planned service lifecycle between maintenance & re-chroming.

Through testing of sample blocks utilizing a variety of groove depths and geometries, we developed a method for deep groove chrome application which has improved coverage and deposit uniformity within the groove, leading to substantially improved lifecycle release performance of stiffening rib surfaces.



ENVIRONMENT

When it comes to our commitment to environmental stewardship, we are not alone. A majority of our supply chain partners and OEM customers also maintain their own environmental sustainability initiatives.

Surfacetec has developed and implemented a formal in-house Environmental Management System (EMS) and is fully prepared to integrate metal plating and surface finishing within environmentally managed supply chains.

Rather than simply a set of metrics and limits, the EMS establishes a broad framework of best practices for environmentally responsible operation. This framework is designed to identify and control environmental impact aspects, and constantly evaluate and improve performance of the entire operation over time.

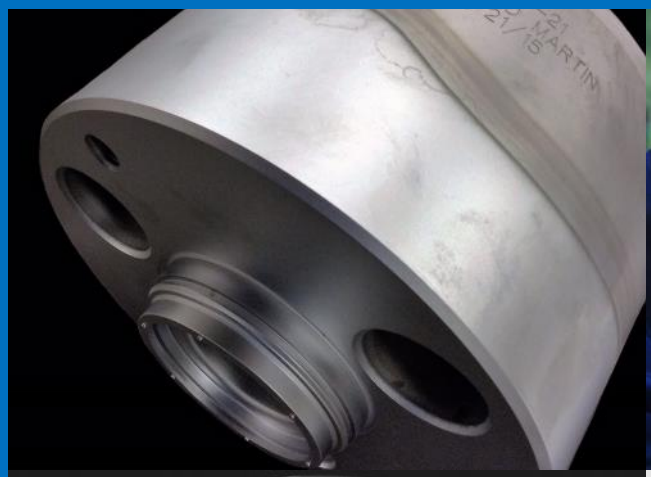
Once implemented, the EMS encompasses data collection, measurement, and monitoring of key environmental aspects to continually assess progress towards meeting defined targets and goals.

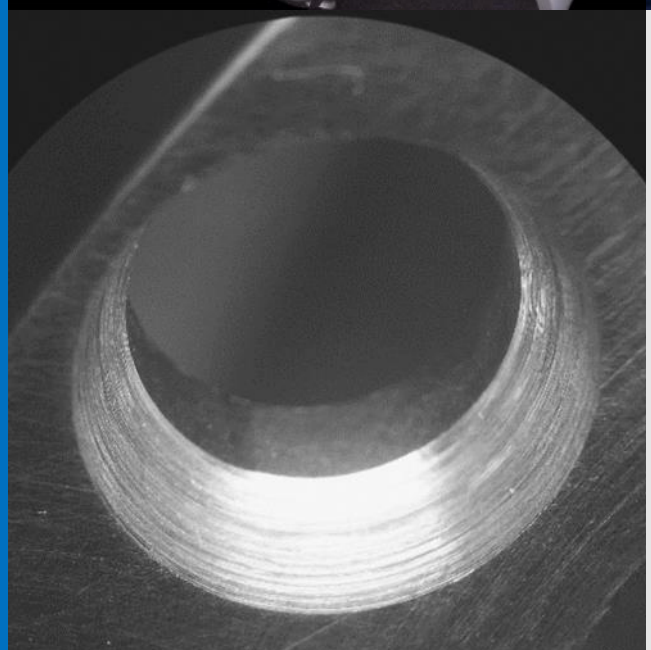
QUALITY

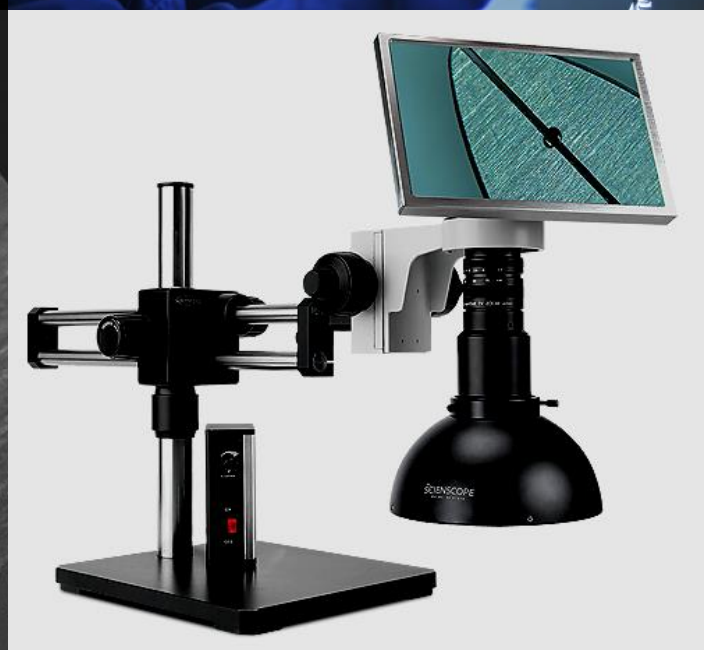
Meeting the strict industry standards and dimensional tolerances required by our customers is a baseline in the performance of our work. Although we are well accustomed to meeting and exceeding these criteria, we never consider this as simply a given.

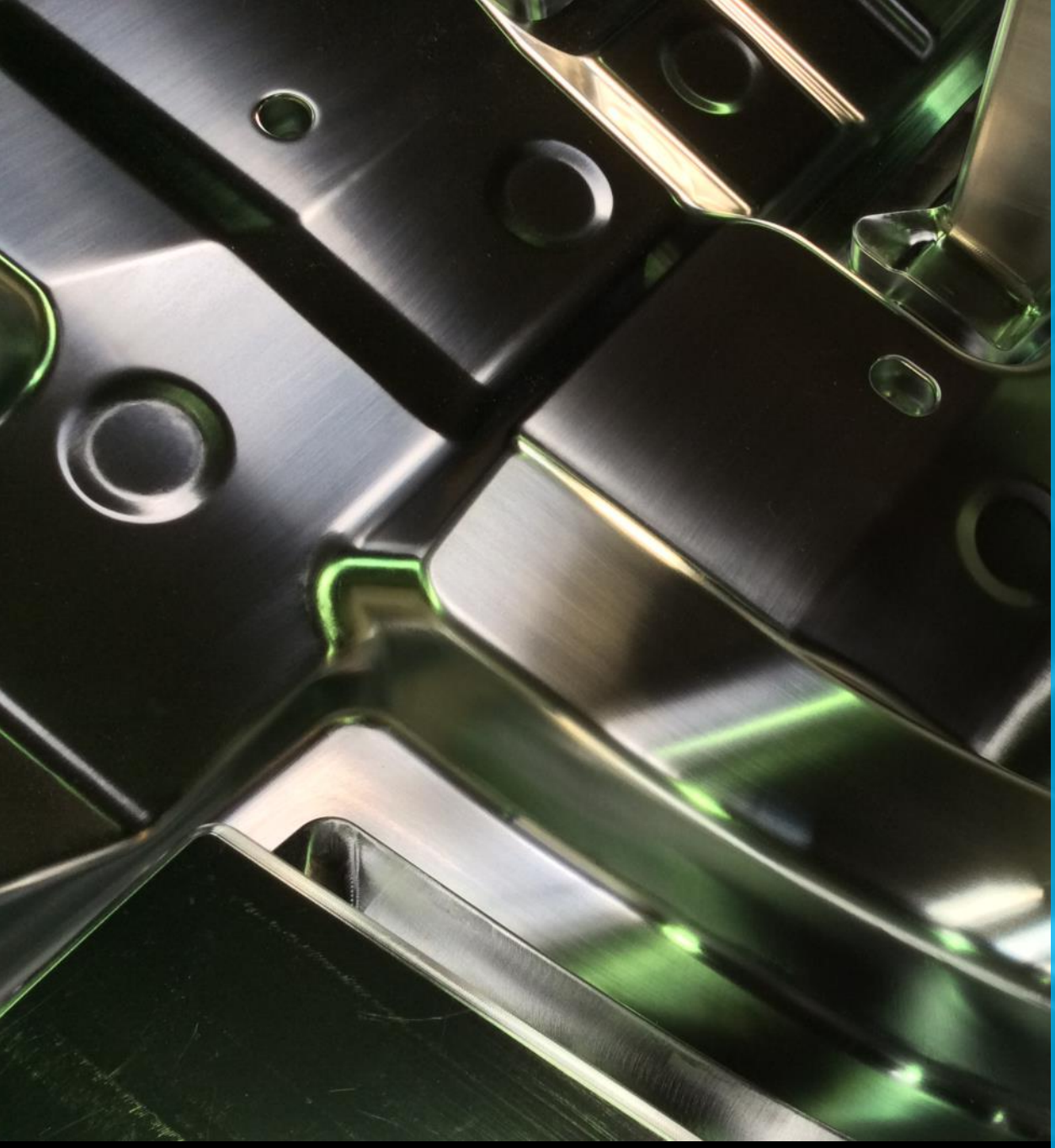
Producing the highest quality work on a consistent basis requires planning, diligence, continuity, and an intense focus at varying scales of detail, all propelled by a necessary sense of urgency.

Our quality control protocol goes beyond hardness testing and microscopic inspection. Parameters that can be quantified are critical, but what can't be quantified also becomes crucial in the process of collecting quality control data, such as leveraging the technical proficiency and experience of our production team in evaluating each project component for specification conformity before it leaves our facility and ships to our customers.









Takao Nagai
CEO
takao@surfaceteccorp.com

Luis Gonzalez
President
luis@surfaceteccorp.com

Lou Lechner
Sales Manager
lou.lechner@surfaceteccorp.com

John Miller
Compliance Officer
john@surfaceteccorp.com

Surfacetec Corporation
471 Podlin Drive
Franklin Park, IL 60131
Tel: 630.521.0001
Fax: 630.521.1557
www.surfaceteccorp.com

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