

# Inova Cast & Inovative Technocast—at the top of the investment casting market

*Inova Cast Pvt. Ltd & Inovative Technocast Pvt. Ltd.—two units under one management team—supply quality investment castings to a wide range of customers across Asia, Europe, the Middle East, and North America. Led by an array of production, design, metallurgy, casting, marketing, and finance experts with 175 years of collective experience, the two units have perfected the lost wax casting process, with a particular focus on flow control valves, safety valves, and pump components. In a recent interview, director K. J. Kotadia described the group’s 25 year development, their continuous improvements to equipment and technique, and their current status as the leading investment casting foundry in India.*

By Daniel Sweet

For those familiar with the Indian casting market, it should come as no surprise that Inova Cast Pvt. Ltd & Inovative Technocast Pvt. Ltd. are headquartered in Rajkot, the casting capital of the country. But Rajkot, some 800 km from Mumbai, had not earned its current reputation for casting in 1993. At that time, there were only five investment casting foundries in India—and Inova Cast was the newest. In a recent interview, director K. J. Kotadia explained that during the 1990s, domestic demand for investment casting, especially in the private sector, was low, and the demand that did exist came from only a handful of state-owned firms. But as globalization began to transform the world economy and as the Indian market started courting foreign direct investment, Inova Cast began to grow.

“The first ten years of the company were a real period of transformation, both for the casting business and for our country,” Mr. Kotadia said. “The rise of a global market, with India as a major destination for investors, provided us a gateway to explore the international market. As more opportunity opened to us, our growth took off, as did the number of casting companies in Rajkot and across India in general.”

Asked about some of the highlights of the company’s early years, Mr. Kotadia recalled a few important milestones. “Looking back, I am very fortunate. I was able to be present for many big events in the company’s early growth. I witnessed all the major changes: first and foremost, the expansion of Inova Cast to include its secondary unit, Inovative Technocast. Our original company, Inova Cast, began in 1993 with

an installed capacity of 30 MT per month. When the chance came to expand, we decided in 2004 to open a second unit, Inovative Technocast, rather than to expand the mother company. Inovative Technocast started out with the same production capacity, and it was one of the first big steps to get where we are today.”

“The next milestone came when we increased our production capacity to 60 MT/month in both units. Meanwhile, we began building a strong core team. This team became crucial to our next milestone—building a well-equipped quality assurance facility, followed by an in-house machining facility in 2007 and a complete factory modernization in 2018. With all these milestones, we have become a company of over 300 employees—and as Rajkot became the casting capital of India, we became one of the best casting companies in Rajkot.”

## The benefits of casting

Due to its versatility, investment casting is a common technique in the production of valves and related components. Mr. Kotadia outlined some of the benefits of investment casted components, especially when sourced from the experts at Inova Cast & Inovative Technocast.

“Both our units supply ferrous & nonferrous, machined/unmachined investment castings for various type of flow control valves, safety valves, pump components, and level gauge bodies & covers. These components are used in a wide range of applications, including normal,

corrosive, cryogenic, and high temperature working conditions.”

“This variety in material is especially important to one of our major market sectors—the oil & gas industry. Castings for the oil & gas industry must be durable and made from materials that provide high resistance to corrosion caused by chemicals and the environment. Investment casting excels in providing high quality components in stainless steel, cobalt-based alloys, and other materials, offering high strength, as well as corrosion and wear resistance for demanding applications. But beyond this, investment casted components offer exceptional design flexibility—complex, intricate components can be cast to near net shape. The versatility in alloy selection is another positive, as is tight tolerances, exceptional surface finishes, rapid prototyping, repeatability, and low-tooling costs. When a company unfamiliar with investment-casted components discovers what we at Inova Cast & Inovative Technocast can do for them, they become ‘casting converts!’”

“Of course, not all clients are from the oil & gas industry,” Mr. Kotadia said. “We also produce castings for the medical sector, as well as the textile, automobile, and pharmaceutical industries.”

## On the casting floor

In the Inova Cast & Inovative Technocast foundries, components move through a number of steps before they are ready to be shipped to the client. From start to finish, the



the process, and at Inova Cast and Inovative Technocast, wax assembly is backed by a proprietary, company-developed computerized data bank, monitored by a highly experienced team of engineers.”

“In the next stage, shell manufacture, the wax assembly is coated with a ceramic shell by repeated dipping in ceramic slurries and, alternately, in dry beds of sand and clays. For heavy or thick sections of any part, additional coating is added to ensure strength to the shell. This eliminates bulging

*Not all clients are from the oil & gas industry. We also produce castings for the medical sector, as well as the textile, automobile, and pharmaceutical industries.*

casting process involves many overlapping and intricate processes.

“It all begins with wax injection,” Mr. Kotadia said. “With the help of die tools, wax patterns are produced for the component by injecting wax under the required pressure. Inova Cast and Inovative Technocast both use highly sophisticated wax injection presses, giving us a high degree of control over the finished product.”

“The piece then moves on to wax assembly. We produce a wax pattern from a single cavity or multi-cavity tool, all assembled on wax runners, a wax-made pouring cup, tie-bar, and other handling arrangements. This is one of the most detailed and important stages of

or distortion of the cast. The ceramic shell is then heated under pressure in an autoclave and the wax is melted off, leaving a hollow shell. At this stage, the most important step is applying the primary coating, wherein a very fine grade of sand is used. This in turn results in a casting with excellent reproduction detail and allows for the designated surface finish.”

“Casting begins when the hollow shell is ready for firing. The shell is pre-heated in a shell backing furnace and prepared to receive the customer-specified alloy. Induction melting units are used to melt the alloy, and strict control over the shell backing temperature is maintained. When the molten alloy is



**Meet Mr. Kotadia**

"I graduated in the year 2000, and upon graduation I immediately joined one of the biggest chemical factories in the region—Gujarat Heavy Chemicals Limited—as a trainee engineer. Within a year I was promoted as assistant to plant designer, and across this first job I was fortunate to be exposed to a good range of hands-on experiences. I then joined Inovacast, beginning in the purchasing department. From there, I moved across production, melting, quality assurance, machining, marketing, shipping. I spent close to a year and a half in each department, which I think is the best way to learn a business. These 14 years of experience in every department of the company, along with my background in technical engineering drawings, prepared me well for my current position as director."



*On the subject of the first ten years of Inova Cast, Mr. Kotadia said in a recent interview: "The rise of a global market, with India as a major destination for investors, provided us a gateway to grow the business. As more opportunity opened to us, our growth took off, as did the number of casting companies in Rajkot and across India in general."*

behind Inova Cast and Inovative Technocast has perfected the process, and our collective experience, along with our state-of-the-art equipment, makes what could be considered an artform into an exact and highly successful science."

**Equipment and equipment operators**

For Mr. Kotadia, there are two elements that in tandem distinguish Inova Cast and Inovative Technocast from other casting companies; the experienced team behind the casting operations, and a dedication to modern casting equipment and technique.

On the subject of equipment, Mr. Kotadia shared some of the recent developments in machinery that have allowed Inova Cast and Inovative Technocast to produce such high-quality castings.

"As I mentioned at the start of the interview, both units of the company began undergoing updates in the mid-2000s, and in 2018 we completed a complete factory overhaul. We built a well-equipped, state-of-the-art quality assurance facility. We also built an in-house machining facility, and all our CNC machines were updated to the latest models. These updates, combined with new measuring machines and varying test benches, have kept our supply 100% defect free and have allowed us to produce components certified by a number of accreditation bodies. Some of our approvals,

beyond end-user specific certificates, include ISO 9001, PED / Wo, Norsok M-650, Lloyd's Register, ISO 45001 and ISO 14001."

"Beyond these specific upgrades, there are a number of technological innovations we employ on our casting floor, including time-tested process controls supported by customized foundry software, along with an in-house metal, wax, and sand testing laboratory."

"Of course all this technology is helpful," Mr. Kotadia said, "but what brings it together is the dedicated team behind the operation. Put together, there is over 175 years of collective experience at Inova Cast and Inovative Technocast. From our sales staff to our technical managers, every department of the company is streamlined to produce high quality products for our clients. When it all works together, there is nothing we cannot achieve."

**Service-orientation**

As proof positive of Inova Cast and Inovative Technocast's ability to overcome any customer challenge, Mr. Kotadia shared one recent experience that put the team's abilities to the test. "One of the major valve manufacturers—with more than 30+ production facilities around the world—is a long-time client of ours. Per their request, we developed a high-end actuator body, despite a narrow timeline and the complex geometry of the piece. The major problem

with this assignment related to geometry—there was a shrinkage issue when casting the piece. Our team went through several trials with different metal feed positions, and eventually we were able to achieve a shrink-free casting. Beyond this, another challenge to come out of this order related to machining. The inner diameter of the body was very critical, and tolerance was in only a few microns. Our team not only found the solution for this machining problem in our trials, but we were able to implement the solution in mass production. Since then, we have supplied almost 250 actuator bodies—and with 100% customer satisfaction."

**Looking ahead**

With their knowledgeable and dedicated staff and their state-of-the-art casting equipment, it is safe to say that Inova Cast and Inovative Technocast will continue their growth well into the future. For now, Mr. Kotadia said that there are plans to continue producing the highest quality investment castings on the market, and potentially an expansion into lost foam casting in the coming years. "There is even more growth ahead, and thanks to the Make In India initiative, I expect to see demand for castings begin to increase. Whether the demand comes from the automobile, medical, aerospace, defense, or oil & gas sectors, Inova Cast and Inovative Technocast will be there to meet it head on."

de-gassed, we fill the pre-heated shell to the required level and allow the alloy to solidify. "At the end of the process, we move to finishing. When the metal filled ceramic shells are fully cooled, the ceramic shell is removed mechanically from the cast assembly. All cast parts are then removed from the runner system by either cut-off wheel or conventional engineering methods."

"For those unfamiliar with the casting process, the above description helps explain how involved and delicate the procedure is," Mr. Kotadia said. "The experienced team



<b>Product</b>	Precision Investment Castings in Ferrous & Non-Ferrous Metals by Lost Wax Process with Value added High Precision CNC Machining.	
<b>Main Material of Product:</b>	<ul style="list-style-type: none"> <li>• Carbon &amp; Low Alloy Steel: WCB,WCC,LCB,LCC,1.0619</li> <li>• Stainless Steel: CF8M, CF3M, CA-40, CK3MCuN, CN7M, 1.4308, 1.4408, 1.4581</li> <li>• Duplex Stainless Steel: CD4MCuN, GR-4A, GR-5A, GR-6A</li> <li>• Precipitation Hardening Stainless Steel: CB7Cu-1,CB7Cu-2</li> <li>• Nickel Alloys: CW12MW, CZ-100, M35-1, CW6MC, CU5MCuC, N12MV</li> <li>• Austenitic Ductile Iron: D2 (Ni-Resist)</li> <li>• Cobalt Alloys: Stellite-6, Stellite-12</li> <li>• Aluminium Alloys: LM-25, LM-6, LM-9</li> <li>• Copper Alloys: HTB-1, Gun Metal (85-5-5-5), Tin Bronze, Phosphorus Bronze</li> </ul>	
<b>Manufacturing Capabilities:</b>	<b>Single Piece Size:</b> <ul style="list-style-type: none"> <li>• 600 × 600 × 200 mm (Max.)</li> <li>• 25 × 10 × 5 mm (Min.)</li> </ul>	<b>Single Piece Wt. :</b> <ul style="list-style-type: none"> <li>• 0.050 Kg. to 100.000 Kg</li> </ul>

