

# Not-so-standard Production

Though it's assembled on the same line as the Infiniti G35 and G37, the Nissan GT-R features unique, high-tech and, in some cases, hand-built components that help cement its supercar status.

by JEFF GLENN photography courtesy NISSAN



**T**he Nissan GT-R breaks with tradition on many fronts, from a labor-intensive engine and transmission build process to the factory's unique break-in procedures and maintenance support. Our trips to the engine facility and the assembly line emphasized the new flagship's mix of routine and out-of-the-ordinary construction.

The Yokohama facility where the twin-turbo V6 takes shape is Nissan's oldest plant, dating back to the Type 14 Roadster of 1935. Since then, the site has pumped out over 35 million powerplants. GT-R engine assembly takes place inside a temperature-controlled clean room in a corner of a larger building that houses the MR (inline-4 for the Bluebird

Sylphy) assembly line. The contrast between the two engine lines is dramatic.

To get the GT-R room, walk along the heavily automated MR line, past the robotic arms twirling blocks onto a conveyor belt or inserting pre-checked valve springs in heads, and dodge the small self-guided wheeled carts that deliver parts along the





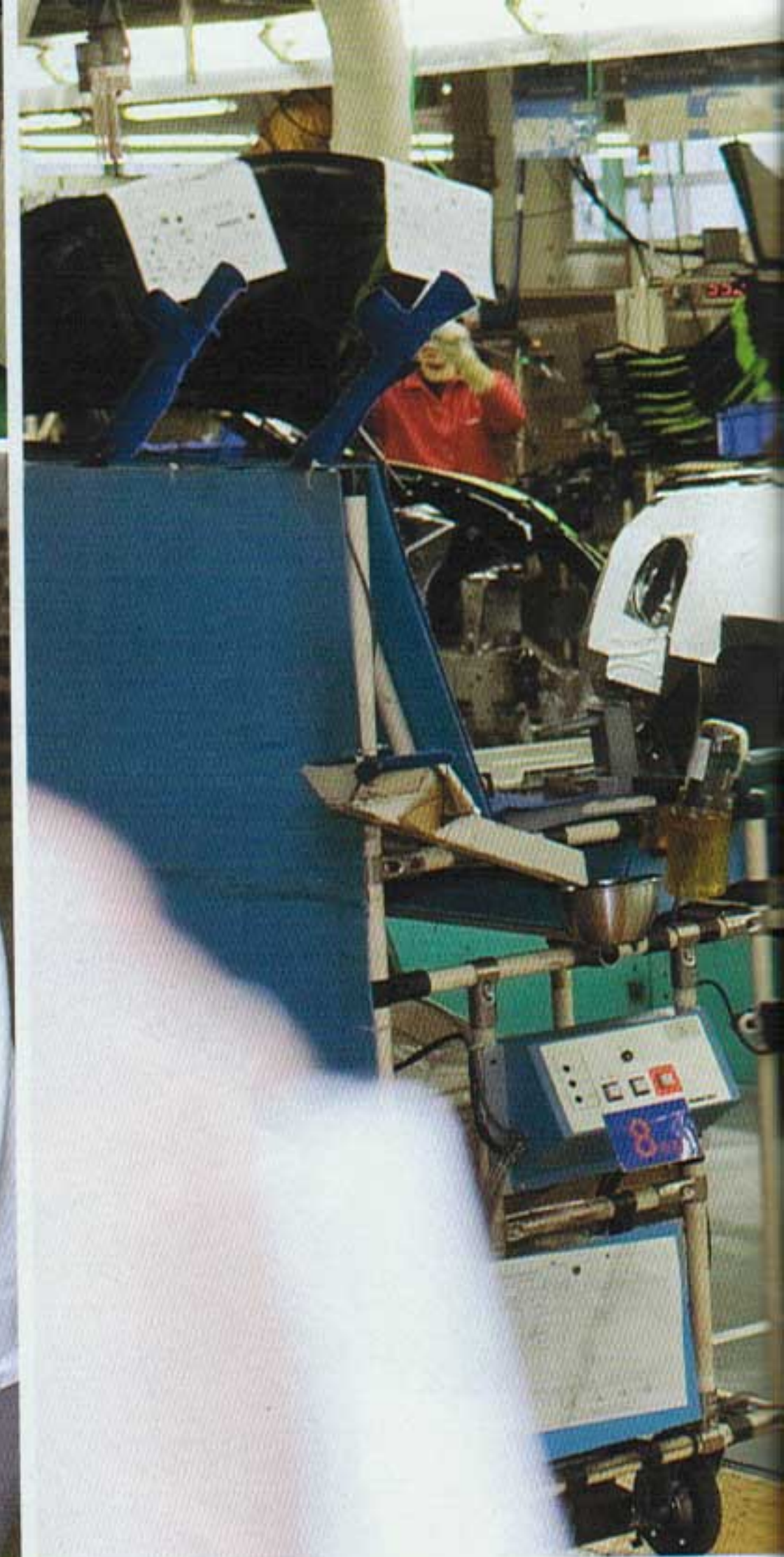
line while belting out high-pitched tunes like little ice cream trucks playing “Mary Had A Little Lamb” and “It’s a Small World.” When the songs intersect, which is pretty often, it sounds like the slot-machine floor of a casino. How the workers don’t stop assembly and start throwing pistons at these things baffles me. There’s a slight

hydraulic haze in the air, and the ambient temperature of the line varies between a toasty 95 degrees in the summer and a chilly 59 in winter.

It’s a totally different world in the climate-controlled GT-R engine assembly area. Here, Nissan went so far as to design special electric tools to combat the dust par-

ticles created by conventional air tools. The engine builders are called *takumi*, and each technician builds an entire engine. Powerplants moves from station to station, followed by its specific *takumi*, as pieces and specific tools are added and needed. The process takes about 200 minutes and involves some 370 steps. If there are any





Counterclockwise from above: Wiring a virgin shell; beefy-looking hub assemblies; rear transaxle/suspension unit readied for shipment; a *takumi* builds an engine inside the Yokohama plant's clean room—he'll follow the V6 from beginning to end; dyno test checks accuracy of instruments; final inspection; each car is given a thorough break-in on a test track.

irregularities detected during assembly, the engine is set aside for analysis.

After assembly, each engine is tested with a no-load firing run, followed by a full-load power test. Initially, Nissan has 13 *takumis* building about 27 motors per day in a single shift, but can add another seven builders and go to a double shift as production ramps up.

**T**he rest of the car is built at Nissan's Tochigi plant, 62 miles north of Tokyo in a facility ringed by a high-speed four-mile banked oval test track. The GT-R's construction and assembly is a mix of highly technical, labor-intensive tasks and run-of-the-mill procedure; blending the two is a first for Nissan. For the most part, the GT-R's structure is a traditional stamped-steel unibody, not unlike that found in an Infiniti G37. However, in the GT-R's body





construction, die-cast aluminum pieces replace stamped steel in several key high-stress areas. Nissan partnered with ALCOA, which has developed a die-casting process that turns the inside of the die into a vacuum. This technique creates less porous and denser material compared to conventional methods, and allows the structures to be around half as thick.

The vacuum die-cast front strut housing/inner fenderwell structure is bolted and glued in place with an adhesive, similar to the process used for constructing race-car monocoques. The piece itself replaces what would have taken 15 separate stamped parts, and weighs 25 percent as much. The additional stiffness is key for chassis rigidity and super-precise alignment. The same process is used for the rear bulkhead, which acts as a rear tower brace and suspension-mounting structure; it delivers a 20-percent mass reduction. Even the doors and inner panels are die-cast, shaving 35 percent of the weight while delivering more dimensional accuracy.

The GT-R's mixing of the conventional and the exotic also applies to materials. The front underbody tray is polypropylene, made for deformability to comply with pedestrian safety standards, a secondary piece just

behind the motor is fiberglass, the central underfloor is a carbon-fiber sheet and the rear diffuser is an aluminum honeycomb-reinforced carbon-fiber composite. Carbon fiber is also used on the twin drive shafts.

On the assembly line, GT-Rs are interspersed among Skyline coupes and sedans, and the corresponding U.S.-bound Infiniti G37s and G35s, with about 20 feet of space between them. Robots do most of the heavy lifting, as the line is 83-percent automated. There are fewer of the musical robotic delivery carts, but they're still present and singing their high-pitched happy songs as the cars snake along the different stations.

After the components are installed along the roughly half-a-mile-long line, the finished cars are driven to a four-wheel dyno station that automatically shortens or lengthens itself to match. Assuming no problems are found, the cars are driven forward to a final quality inspection area, where workers crawl around the car under a sea of intense fluorescent lights to check panel fit and interior finish quality.

The parity with the regular Skylines stops at the end of the line, as each GT-R goes through an elaborate break-in process. Mizuno was adamant that every GT-R be

capable of the performance claims Nissan has made, and to ensure that, each car completes nine laps on a test loop at the facility's proving ground. The loop itself isn't on a picturesque road course or even the banked test track; it looks like a multi-lane drag strip of differing road qualities. The goal is to properly and uniformly break in the various systems on the car. The procedure is well orchestrated, with the first four laps consisting of a set number of progressively harder stops to properly bed the pads. Laps five to seven focus on checking turbo boost and loosening up the transmission. The final laps take the GT-R on a bumpier section of pavement to reduce the friction in the suspension bushings. After the drive, each car is measured at several key body points, and the alignment is re-checked and adjusted if needed.

Each GT-R will receive its own "performance reassurance" maintenance program at select dealerships. It starts with a checkup at 60,000 miles and is followed with annual inspections for three years. In addition to routine maintenance, engine, transmission and alignment specs will be carefully measured. No word yet on whether the dealers will be outfitted with singing robots. ●