



TECHNICAL BUYER'S GUIDE · PRATISHNA ENGINEERS

ELECTRICAL & ELECTRONICS COMPONENTS INJECTION MOULDING MACHINE GUIDE

A practical guide for moulders of wiring devices, circuit protection, enclosures and electronics housings: components, materials, mould requirements, production planning, automation, quality, worked examples and what to send for a machine recommendation.

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WHO THIS GUIDE IS FOR

Owners, plant and production managers, process and quality engineers and purchase teams making switches, sockets, breakers, cable accessories, meter and power enclosures, and electronics housings.

HOW TO USE IT

Sections 01 to 04 define the part, material and mould. Section 05 plans output. Sections 06 to 09 cover automation, quality, examples and your enquiry. Clamp force and shot sizing are covered in our Machine Selection Guide.

NEED A RECOMMENDATION?

Send your drawing, material, part weight, cavities and output target to sales@pratishnaengineers.com. The checklist in Section 09 lists what to include.

SECTION 01 · OVERVIEW

ELECTRICAL & ELECTRONICS COMPONENTS & INJECTION MOULDING

Wiring devices, breakers, enclosures and electronics housings are safety parts first: they insulate live metal, contain faults and must not ignite.

A LARGE AND GROWING SUPPLY BASE

India's electronics production rose from Rs 1.90 lakh crore in 2014-15 to an estimated Rs 13.11 lakh crore in 2025-26, and more than 40 major component makers have set up or expanded, supported by growing Tier-2 to Tier-4 supplier networks^[1]. Moulded housings, carriers and connectors are a large share of that supplier work.

On the electrical side, IS 1293 covers plugs and socket-outlets and IS 3854 covers switches, with clauses on shock protection, dimensions, abnormal heat and fire, and mechanical strength^[2]. Both thermoplastics and thermosets are used for these products^[2].

MAIN COMPONENT CATEGORIES

WIRING DEVICES Switches, plates, sockets, plug tops, knobs	CIRCUIT PROTECTION MCB, RCCB, contactor and relay parts	THERMOSET PARTS BMC and DMC insulators, cooker handles	CABLE MANAGEMENT Ties, clips, glands, grommets
METERS & BOARDS Meter boxes, smart meters, DB enclosures	POWER & SOLAR Inverter, UPS, stabiliser, solar boxes	CONSUMER ELECTRONICS Phones, chargers, power banks, remotes	PRECISION PARTS Connectors and micro-moulded parts

WHY INJECTION MOULDING SUITS THESE PARTS

- Insulating walls, ribs and barriers moulded to exact creepage distances.
- Metal pins and contacts held by insert moulding.
- Flame-rated resins in complex housings.
- High cavitation for ties, clips and knobs.

TYPICAL MANUFACTURING CHALLENGES

- Glow wire, CTI and flame class on one grade.
- Thermoset BMC needs a different process.
- Warp on large flat covers and doors.
- Very thin walls in phones and connectors.

WHERE MOULDING SITS IN THE PRODUCT CHAIN

COMPOUND FR, GF, thermoset	DRYING PA, PC, PBT	INJECTION MOULDING housings, carriers	INSERTS pins, contacts, bushes	ASSEMBLY welding, fastening	TYPE TESTS fire, tracking, IP	CERTIFICATION BIS and customer
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Not covered: cables and conduits (extruded), silicone keypads (compression moulded), PCBs, pins, contacts and busbars. Lighting products are covered in the lighting guides.

KEY REQUIREMENTS FOR ELECTRICAL AND ELECTRONIC PARTS

FIRE RESISTANCE Glow wire GWFI and GWIT describe how a material behaves against a hot wire ^[3] ^[4]	TRACKING RESISTANCE CTI gives the voltage an insulator withstands under wet contamination ^[5] .	SHOCK PROTECTION Live parts must not be accessible ^[2] .
DIMENSIONS Pin and contact positions set safety and interchangeability ^[2] .	INGRESS PROTECTION Enclosures rated by IP code to IEC 60529 ^[10] .	MECHANICAL STRENGTH Checked with a pendulum hammer on wiring devices ^[2] .

SECTION 02 · COMPONENTS

MAJOR ELECTRICAL & ELECTRONICS COMPONENTS

The parts covered, grouped where they share materials and moulding demands.

COMPONENT	MATERIAL(S)	INJECTION MOULDING CONSIDERATIONS
Modular switch (base, rocker, contact carrier); socket plate	PC, PC/ABS, ABS, POM, UF	V-0, glow wire and CTI on one grade. No sink on the rocker face. Flat, glossy plate colour-matched across resins.
Socket outlet body and insert; electric plug top (2 and 3 pin)	PC, PC/ABS, PA66, PBT, PP, PVC, UF	Glow wire at moulded wall thickness. Brass pins as inserts; pin spacing per IS 1293. No voids at pin roots.
Extension board (body and cover)	FR ABS, PC/ABS, PC, FR PP	Long thin housing, flow length limits fill; multi-gate or hot runner. Cored bosses on show walls.
Fan regulator, dimmer and switch knob	ABS, PC, POM, UF	D-shaft or spline bore tolerance; no solid boss under the show face. High cavitation.
MCB and RCCB housings; circuit protection parts (arc chutes, trip levers, contact carriers, terminal covers)	PA66-GF, PBT-GF, PA46/PPA, DMC/BMC, melamine	No flash in arc path or pockets. Creepage moulded in. Thermoset or high-heat PA near arcs. Condition nylon before gauging.
Contactors / relay housing and coil bobbin	PA66-GF (V-0), PBT-GF, PA46/PPA, DMC/BMC	Bobbins need heat-ageing (RTI) performance; flash-free winding surfaces.
BMC insulating part; DMC component	BMC / DMC polyester, glass-polyester	Thermoset: cool barrel (about 60 °C), mould about 135 to 185 °C, stuffer feed, abrasive, no regrind, low shrinkage.
Cooker handle	DMC/BMC, phenolic, melamine, UF, FR PA66-GF	Heat-resistant insulating part; moulded-in fixing inserts; flash cleaning in the cell.
Cable tie; cable clip	PA66 (heat or UV stabilised), PA12, PA6, PP, PVC	Long thin flow; 16 to 64 cavities. Condition nylon ties before packing. Loop tensile is the sold spec.
Cable accessories (glands, grommets, trunking clips, connectors)	PA66, PA6-GF, PP, PVC, TPE	A family run multi-cavity. TPE overmould or ring for IP sealing; UV grades outdoors.
Electricity meter box; smart meter enclosure	FR PC, PC/ABS, BMC/SMC, FR PP, PPO/PPE	Large flat areas; tamper evidence, 15-year UV life, flat seal face. Clear window as separate part or second shot.
Electrical enclosure; DB enclosure and door (4 to 12 way)	FR ABS, PC, PC/ABS, PA6-GF, FR PP, BMC/SMC	Seal-face flatness for IP; DIN rail and knock-out tolerance; 960 °C glow wire class for live-part carriers.
Solar junction box; solar connector (MC4 type)	PPO/PPE, PC (UV), PA66-GF (UV), TPE	25-year outdoor service; certified grades only. Connector fit from -40 to +90 °C; gasket for IP67/IP68.
Stabiliser housing; inverter body; UPS housing	FR ABS, PC/ABS, FR PP, PA6-GF	Large vented panels warp; rib rather than thicken. Creep at internal heat; V-0 near power parts.
Charger housing; power bank / battery pack housing	FR PC, FR ABS, PC/ABS, PC	V-0 around mains and cells. Ultrasonic welded, so stable shrinkage and no regrind.
Router, set-top box and remote control housings	FR ABS, PC/ABS, PC, ABS, TPE, POM	Flat tops warp; cored bosses. IR window, antenna keep-out, two-shot TPE keys, door latch.
Mobile phone housing; wearable component	PC, PC/ABS, PA6-GF, PC-GF, TPU, TPE, PMMA	Walls about 0.6 to 1.0 mm at high speed; insert moulding over metal; class A surface; skin-safe grades.
Electronic connector; micro-moulded part	LCP, PA46, PA9T/PPA, PBT-GF, PA66-GF, POM, PEEK, PC, COC	Walls down to about 0.08 mm; milligram shots, so metering decides. Flash in contact bores is scrap.

SECTION 03 · MATERIALS

MATERIALS USED FOR ELECTRICAL & ELECTRONICS COMPONENTS

Grades are chosen for fire, tracking and heat first, at the moulded wall thickness.

MATERIAL	TYPICAL COMPONENTS	RELEVANT PROPERTIES	PROCESSING CONSIDERATIONS	LIMITATIONS TO CHECK
PC, PC-GF (FR, UV)	Switches, sockets, enclosures, meters, phones	Tough, flame-rated grades, clear windows.	Dry thoroughly; hydrolysis if wet ^[8] .	Stress cracking; UV grade outdoors.
PC/ABS, ABS, FR ABS	Plates, housings, remotes, power banks	Easy to mould, good finish.	Dry; mix FR blends well.	Creep and heat near power parts.
PA66, PA6, PA12	Ties, clips, glands, plugs, sockets	Tough, flexible when conditioned.	Dry before moulding ^[7] ; ties brittle until conditioned.	Size grows with moisture.
PA66-GF, PA6-GF (FR)	Breaker parts, relays, enclosures, handles	Stiff, heat resistant, V-0 grades.	Dry; abrasive glass wears screw and gates.	Glow wire and CTI at thin walls.
PA46, PPA, PA9T	Breaker parts, bobbins, connectors	High heat for arc zones and soldering.	High melt and mould temperatures; dry.	Cost; high-heat equipment.
PBT, PBT-GF	Sockets, breakers, relays, connectors	Stable dimensions, good electrical properties.	Dry before moulding; hydrolysis if wet ^[8] .	Hydrolysis in hot, humid service.
PPO/PPE	Solar boxes and connectors, smart meters	Heat, flame and low dielectric loss.	Moderate drying; high melt temperature.	Specify the certified grade.
LCP, PEEK, COC	Connectors, micro parts	Thin-wall flow (LCP), high heat.	Dry; precise metering.	Cost; weld lines in LCP.
POM	Knobs, shutters, micro parts, remote parts	Stiff, low friction.	Avoid overheating and hold-up.	Not flame rated.
PP, FR PP, PVC	Plugs, clips, boards, meters, housings	Low cost; FR grades available.	Low moisture uptake ^[8] ; PVC heat-sensitive.	Lower stiffness and heat.
TPE, TPU	Gland seals, keys, straps	Soft, sealing, grip.	Match grade to substrate; dry ^[9] .	Bond validated per pair ^[9] .
PMMA	Wearable sensor windows	Optical clarity.	Dry; high-polish tool.	Scratches; impact.
DMC/BMC/SMC, phenolic, melamine, UF	Breakers, insulators, handles, meter boxes	Rigid, heat and arc resistant; no drip.	BMC force-fed by stuffer; limited shelf life ^[6] .	No regrind; flash control.

General material behaviour only. Fire and tracking ratings are grade and thickness specific; check the supplier certificate.

FOUR RATINGS, ONE MATERIAL

RATING	WHAT IT MEASURES	WHY IT MATTERS TO THE MOULDER
GWFI ^[4]	Highest glow-wire temperature at which the material self-extinguishes within 30 s	Rated at a thickness; thinner walls may fail
GWIT ^[3]	25 K (or 30 K) above the highest temperature with no ignition	Live-part carriers in wiring devices
CTI ^[5]	Voltage withstood with 50 drops of contaminant (IEC 60112)	Grade and surface quality near contacts

SECTION 04 · DESIGN & MOULD

COMPONENT DESIGN & MOULD REQUIREMENTS

In electrical parts the geometry carries safety: barriers, creepage paths and pin positions are moulded in, not added later.

DESIGN FEATURES THAT AFFECT MOULDING

FEATURE	WHY IT MATTERS IN ELECTRICAL PARTS	MOULDING IMPLICATION
Creepage and clearance ribs	Distances between live parts are safety dimensions.	Full fill of thin ribs; no short shots or flash.
Live-part carriers	Glow-wire rating depends on wall thickness ^[4] .	Hold the designed wall; avoid thin spots from core shift.
Pin and contact inserts	Plug pin spacing and projection are specified ^[2] .	Insert location, preheat, no voids at pin roots.
Large flat covers	Plates, doors, inverter and meter covers.	Even cooling, ribs, multiple or sequential gates.
Bosses on show faces	Screws in plates and housings.	Cored and gusseted bosses to avoid sink.
Weld joints	Chargers and power banks are ultrasonically welded.	Stable shrinkage; energy directors held to size.
Thin walls	Phones, connectors, ties.	High injection speed and pressure; venting.

MOULD CONSIDERATIONS

ITEM	ELECTRICAL POINTS	ITEM	ELECTRICAL POINTS
Cavity layout	Ties, clips, knobs: 16 to 64. Housings: 1 to 4.	Steel	Hardened steel for glass-filled and BMC compounds.
Runner	Hot runners for long thin parts and FR grades.	Heating	Thermoset moulds are heated, not cooled.
Venting	Critical at thin ribs and in thermoset moulds.	Shrinkage	BMC shrinks far less; do not scale a thermoplastic tool.
Inserts	Accurate seats for pins, contacts and bushes.	Cooling	Even cooling for flat seal faces and doors.

DESIGN REVIEWS BEFORE STEEL IS CUT

FLOW SIMULATION	WARP PREDICTION	CREEPAGE CHECK	INSERT REVIEW
Thin ribs, weld lines near contacts.	Plates, doors and seal faces.	Moulded distances against the standard.	Seats, preheat and retention.

THERMOPLASTIC AND THERMOSET MOULDS COMPARED

ASPECT	THERMOPLASTIC (PA, PC, PBT)	THERMOSET (BMC, DMC)
Barrel	Hot, melts the resin	Kept cool so the compound does not cure
Mould	Cooled to solidify the part	Heated to cure the part
Feeding	Pellets by gravity	Stuffer forces dough into the screw ^[6]
Scrap	Regrind possible where allowed	Cured scrap cannot be reprocessed
Main tooling issue	Warp, sink, weld lines	Venting and flash

SECTION 05 · PRODUCTION PLANNING

PRODUCTION CAPACITY & CYCLE-TIME PLANNING

Ties and knobs run in tens of cavities on short cycles; thermoset breaker parts run on cure time; large housings run slowly in few cavities.

OUTPUT

Parts/hour = Cavities × 3600 ÷ Cycle time (s)

Effective/hour = Parts/hour × Utilisation

Day = Effective/hour × Hours run

Utilisation covers mould and colour changes, drying, deflashing and rejects.

EXAMPLE 1 · 32-CAVITY PA66 CABLE TIE

32 × 3600 ÷ 20 s = 5,760 /h

× 0.85 utilisation = 4,896 /h

× 22 h = 107,712 /day

× 26 days = 2,800,512 /month

EXAMPLE 2 · 4-CAVITY BMC BREAKER CASE

4 × 3600 ÷ 40 s = 360 /h

× 0.85 = 306 /h · × 22 h = 6,732 /day

× 26 days = 175,032 /month

Working backwards: for 250,000 cases a month in 572 running hours, you need 437 per hour. Cavities = $437 \times 40 \div (3600 \times 0.85) \approx 5.7$, so 6 cavities or a second machine.

Illustrative example. Cycle and cure times, 85% utilisation, 22 h/day and 26 days/month are assumed. Actual requirements depend on the component, material, mould and production conditions.

WHAT SETS THE CYCLE TIME

PHASE	ELECTRICAL INFLUENCE
Injection & hold	Fast fill of thin ribs and long ties.
Cooling or cure	Cooling rises roughly with wall thickness squared ^[12] ; BMC parts cure in a hot mould.
Inserts	Pins and contacts loaded each cycle.

BALANCING CAVITIES, CLAMP FORCE AND OUTPUT

FR PP EXTENSION BOARD COVER	PROJECTED AREA	CALCULATED FORCE	RATED AT 85%	SHOT	EFFECTIVE OUTPUT
1 cavity	226 cm ²	91 t	107 t	115 g	87 /h
2 cavities	452 cm ²	182 t	214 t	230 g	175 /h
4 cavities	902 cm ²	363 t	427 t	458 g	350 /h

Illustrative example. Force = projected area × clamp factor K × safety factor S. PP, PE and PS are commonly given 2 to 3 US tons per square inch^[11], about 0.28 to 0.42 t/cm²; K = 0.35 t/cm² and S = 1.15 assumed, to be checked against the FR grade. Also assumed: 220 cm² and 110 g per cover, runner area 6 / 12 / 22 cm² and weight 5 / 10 / 18 g, 35 s cycle, 85% utilisation.

WHAT LIMITS OUTPUT BY PRODUCT GROUP

PRODUCT GROUP	USUAL LIMIT	PLANNING POINT
Ties, clips, knobs	Fill of long thin sections, cavities	Conditioning time before packing
Breakers, BMC parts	Cure time and deflashing	Hot-mould heating and cleaning in the cycle
Large housings	Cooling of flat panels	Few cavities; plan machine hours per model

MACHINE UTILISATION AND PLANNED DOWNTIME

DRYING

Before PA, PC and PBT runs^{[7][8]}.

BMC HANDLING

Use compound within its shelf life^[6].

WEAR CHECKS

Screws and gates on filled and BMC grades.

COLOUR MATCHING

Switch ranges in several resins.

SECTION 06 · AUTOMATION

AUTOMATION & PRODUCTION EFFICIENCY

Electrical moulding automation centres on inserts, conditioning and handling of safety-critical parts without damage.

AUTOMATION	WHERE IT ADDS VALUE IN ELECTRICAL PARTS	WHEN IT USUALLY MAKES SENSE
Insert loading	Places pins, contacts and bushes in the mould.	Plug tops, sockets, handles, phone frames.
Robot take-out	Removes plates, covers and housings without scratches.	Cosmetic and large flat parts.
Stuffer and BMC feed	Force-feeds dough compound to the screw ^[6] .	Every BMC and DMC job.
Deflashing and mould cleaning	Clears thermoset flash between shots.	Thermoset breakers, insulators, handles.
Moisture conditioning	Brings nylon ties and parts to service moisture.	PA66 ties and parts gauged after moulding.
Dryers and closed loaders	Keep PA, PC and PBT dry ^[6] .	Every hygroscopic resin run.
Ultrasonic welding	Closes chargers, power banks and housings.	Welded assemblies at volume.
Vision and gauging	Checks pin position, flash in bores, short ribs.	Wiring devices and connectors.

Wiring device makers run many small parts in several resins and colours. Automation that serves many moulds, such as sprue pickers, conveyors, dryers and counting, usually pays back before automation built for one tool.

AUTOMATION BY PRODUCT GROUP

PRODUCT GROUP	MAIN AUTOMATION	WHY
Switches, sockets, plugs	Insert loading, vision, assembly	Pins and contacts in every part
Breakers, BMC parts	Stuffer, deflashing, robot	Thermoset flash and hot moulds
Ties, clips, glands	Conditioning, counting, bagging	Brittle until conditioned, sold by count
Housings, covers	Robot take-out, welding	Large cosmetic parts, welded joints

DECIDING ON AUTOMATION

SAFETY Automated insert and vision checks catch missing or shifted pins.	VOLUME & LABOUR Assembly and inspection often take more labour than moulding.	COSMETIC YIELD Plates and covers scratch easily when handled.
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INTERFACES TO SPECIFY ON THE MACHINE

THERMOSET PACKAGE Stuffer, cool barrel, heated mould zones.	ROBOT Signal interface and safety interlocks.	INSERT SENSING Signals to confirm insert presence.	DATA OUTPUT Shot data for certification records.
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WHERE THE COST OF A MOULDED PART COMES FROM

MATERIAL FR, GF, thermoset	MACHINE per machine hour	LABOUR inserts, assembly	POWER drying, hot moulds	MOULD hardened, heated	REJECTION flash, pins, warp	PACKING counts, protection
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SECTION 07 · QUALITY

QUALITY, TESTING & COMMON DEFECTS

An electrical part fails in the wall or at the switchboard: it must insulate, resist heat and fire, and fit the mating part every time.

TESTS AND CHECKS

CHECK	WHAT IT INVOLVES	LINK TO MOULDING
Abnormal heat and fire	IS 1293 and IS 3854 require insulation that does not deteriorate or start a fire under abnormal heat ^[2] .	Grade, wall thickness, voids
Glow wire	GWFI and GWIT tests to IEC 60695-2-12 and -2-13 ^{[3][4]} .	Thickness, grade, FR dispersion
Tracking	CTI to IEC 60112; groups I (≥600 V) to IIIb (100 to 175 V) ^[5] .	Grade, surface contamination
Mechanical strength	Pendulum hammer blows on plugs, sockets and switches ^[2] .	Weld lines, voids, moisture
Normal operation	Plug inserted and withdrawn 10,000 times ^[2] .	Contact pockets, shutter parts
Dimensions	Pin spacing and interchangeability gauges ^[2] .	Insert location, shrinkage
Ingress protection	IP code tests on enclosures and glands ^[10] .	Seal face flatness, gasket fit

Test clauses are summarised from the BIS overview and standard abstracts. Use the current editions of IS 1293, IS 3854 and the product standard for each part.

Type tests prove the design once; the moulding floor must then keep every batch like the tested samples. A change of grade, masterbatch or wall thickness can move glow-wire and tracking results, so treat it as a design change.

IN-PROCESS CONTROLS

PIN GAUGES Spacing and projection on plug tops.	CONDITIONED GAUGING Measure nylon parts after conditioning.	FLASH CHECK Arc paths, contact bores, winding faces.	FLATNESS Plates, doors and seal faces.
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TROUBLESHOOTING COMMON DEFECTS

DEFECT	POSSIBLE CAUSES	EFFECT ON THE PART	AREAS TO INVESTIGATE
Flash in arc path or bores	Worn shut-offs, high pressure, thermoset flash	Safety failure, scrap	Parting line, venting, pressure
Short ribs	Thin ribs, poor venting	Creepage distance lost	Injection speed, venting, gate
Voids at pin roots	Thick sections, cold inserts	Tracking and weak pins	Hold pressure, insert preheat
Warped plates and doors	Uneven cooling, early ejection	Stand-off, IP failure	Cooling, gating, ribs
Sink on show faces	Solid bosses, short hold	Cosmetic reject	Cored bosses, hold time
Brittle ties and plugs	Dry-as-moulded or wet resin ^[7]	Snap at pawl or pins	Conditioning, drying
Undercured BMC	Low mould temperature, short cure	Weak, soft parts	Mould heating, cure time, compound age ^[6]
Pearlescence, weak welds	Poor mixing of FR PC/ABS	Weld joint failure	Back pressure, screw, drying

SECTION 08 · WORKED EXAMPLES

PRACTICAL MACHINE-SELECTION EXAMPLES

Three typical electrical parts show how the selection logic changes with the component. These are engineering illustrations with assumed inputs, not customer case studies.

A · PA66 CABLE TIE		FILL + CAVITIES
APPLICATION · MATERIAL	Cable tie · PA66	
CHARACTERISTICS	Long, thin strap with a pawl head	
CAVITIES · OUTPUT	32 · about 4,896 per hour at 20 s (Section 05)	
MOULD CONSIDERATIONS	Balanced runner, venting at strap ends, pawl detail	
SECONDARY	Moisture conditioning, counting, bagging	
EVALUATE Fill of the long strap and shot repeatability decide the machine more than clamp force. Dried resin and conditioning decide loop strength. STILL NEEDED CAD, tie length range, monthly volume.		

B · BMC BREAKER CASE		THERMOSET
APPLICATION · MATERIAL	Miniature circuit breaker case · BMC	
CHARACTERISTICS	Arc chamber, mechanism pockets, mating cover	
CAVITIES · OUTPUT	4 · about 306 per hour at 40 s (Section 05)	
MOULD CONSIDERATIONS	Heated mould, venting, hardened steel, flash control	
SECONDARY	Deflashing, assembly, trip test	
EVALUATE The machine needs a thermoset package: stuffer feed, cool barrel, heated mould zones and wear protection ^[6] . Tonnage needs projected area. STILL NEEDED CAD, compound data, cure time trials, volume.		

C · FR PP EXTENSION BOARD COVER		LARGE FLAT
APPLICATION · MATERIAL	Extension board cover · FR PP	
CHARACTERISTICS	About 220 cm ² and 110 g per cover (assumed); long and thin	
CAVITIES · OUTPUT	2 · about 175 per hour at 35 s (Section 05)	
MOULD CONSIDERATIONS	Hot runner or several gates, cored bosses, even cooling	
SECONDARY	Assembly with busbar and sockets	
EVALUATE The Section 05 table gives about 182 t calculated and a 230 g shot, so a clamp rated around 214 t or more. STILL NEEDED FR grade data, CAD area, volume.		

Only the board cover is sized mainly by clamp force. For the tie and the breaker case, the enquiry should lead with fill, repeatability and the thermoset package, and the tonnage follows from the drawing.

WHAT DECIDED THE MACHINE IN EACH EXAMPLE

SELECTION FACTOR	A · CABLE TIE	B · BREAKER CASE	C · BOARD COVER
Main limit	Fill of thin strap	Thermoset process	Projected area
Clamp force	Needs projected area	Needs projected area	About 214 t rated
Auxiliaries	Conditioning, counter	Stuffer, deflashing	Hot runner, robot

Illustrative example. Actual requirements depend on the component, material, mould and production conditions.

SECTION 09 • BUYER CHECKLIST

MACHINE BUYER'S CHECKLIST

What to prepare before asking an injection moulding machine manufacturer for a recommendation on an electrical or electronic part.

COMPONENT

- ☐ 2D drawing and 3D CAD model
- ☐ Part weight, runner weight, wall thickness
- ☐ Grade with flame, glow wire and CTI data
- ☐ Inserts: pins, contacts, bushes
- ☐ Creepage and critical dimensions
- ☐ Samples of the current part

PRODUCTION

- ☐ Monthly volume per model and colour
- ☐ Cavity count and target cycle or cure time
- ☐ Operating hours and shifts
- ☐ Assembly and welding steps
- ☐ Conditioning or deflashing time
- ☐ Model and colour change frequency

MOULD

- ☐ New or existing mould; size and weight
- ☐ Thermoplastic or thermoset tool
- ☐ Hot runner, valve gates, heating zones
- ☐ Insert seats and sensing
- ☐ Previous machine specification, if any
- ☐ Maintenance plan for worn gates

ELECTRICAL APPLICATION

- ☐ Product standard (IS 1293, IS 3854 or other)
- ☐ Glow wire class for live parts
- ☐ IP rating for enclosures
- ☐ Outdoor UV and temperature range
- ☐ Certification and test records
- ☐ Customer approval of any change

DOCUMENTS TO REQUEST FROM THE MACHINE SUPPLIER

PLATEN DRAWING

Tie-bar spacing, mounting holes, ejector pattern, nozzle details.

LAYOUT

Footprint, robot and conveyor space, access.

UTILITIES

Connected load, cooling water, air and oil needs.

TRIAL REPORT

Trial or acceptance data at your settings.

QUESTIONS TO ASK BEFORE YOU BUY A MACHINE

#	QUESTION	WHY IT MATTERS FOR ELECTRICAL PARTS
1	Is a thermoset (BMC/DMC) package available with stuffer and heated mould zones?	Breakers, insulators, meter boxes.
2	Is a wear-resistant screw and barrel available?	Glass-filled and BMC compounds.
3	What shot repeatability does the machine hold at my shot size?	Thin ribs, ties and creepage features.
4	How fast and how precisely can injection be profiled?	Thin walls and long flow lengths.
5	Will my largest cover or door mould fit the tie bars and platens?	Meter, DB and inverter housings.
6	What insert-loading and robot interfaces are supported?	Pins, contacts and cosmetic parts.
7	How many hot-runner and mould heating zones can be controlled?	Hot runners and thermoset moulds.
8	Can the machine log shot data for certification records?	BIS and customer audits.
9	What is the energy use per part at my cycle?	Price pressure on wiring devices.
10	What installation, training and spare-parts support is included?	Uptime for seasonal and project demand.

SECTION 10 • TECHNICAL CONSULTATION

PRATISHNA ENGINEERS & TECHNICAL CONSULTATION

Pratishna Engineers Ltd. is a Mumbai-based injection moulding machine manufacturer with in-house design, manufacturing, assembly, testing and service, supplying plastic component manufacturers in India and international markets.

35+

YEARS OF EXPERIENCE

9,000+

MACHINES SUPPLIED

1,000+

CUSTOMERS

In-house

DESIGN TO SERVICE

Machines are used for automotive, packaging, electrical and electronics, medical, consumer, agriculture and industrial applications.

OUR TECHNICAL APPROACH

COMPONENT	MATERIAL	MOULD	PRODUCTION REQUIREMENT	MACHINE CONFIGURATION
1 • CALCULATE Clamp force and shot weight from part, cavities and grade.	2 • CHECK THE MOULD Size, stroke, core pulls and inserts.	3 • CHECK OUTPUT Cycle and cavities against your volume.	4 • CONFIGURE Screw, barrel, controls and auxiliaries.	

SEND YOUR COMPONENT & PRODUCTION REQUIREMENTS

Component drawing · material · part weight · mould details · cavity count · production requirement · flame, glow wire and CTI needs.

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TECHNICAL REFERENCES

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