



TECHNICAL BUYER'S GUIDE · PRATISHNA ENGINEERS

INDUSTRIAL SAFETY & PPE COMPONENTS INJECTION MOULDING MACHINE GUIDE

A practical guide for makers of eye, face, head, hearing, respiratory, foot and fall protection parts: components, materials, moulds, output, 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 engineers and purchase teams moulding goggle and spectacle frames, face shield headgear, respirator parts, helmet harnesses, ear defenders, toe caps and harness hardware.

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

INDUSTRIAL SAFETY & PPE COMPONENTS & INJECTION MOULDING

Most PPE is certified as a complete product. The moulder supplies parts whose dimensions, material and even colourant are part of that certificate.

WHERE INJECTION MOULDING FITS IN PPE

A safety goggle, a respirator or a composite-toe boot contains several moulded parts: frames, face seals, headgear, ratchets, valve seats, cartridge housings, cups and toe caps. Each is small or medium in size, but each carries a tested function such as impact resistance, sealing or load transfer.

In India, industrial safety helmets must conform to IS 2925:1984 and carry the ISI mark under a 2023 Quality Control Order^[1]. PPE safety, protective and occupational footwear to IS 15298 is covered by the PPE Footwear Quality Control Order 2020^[2]. Export products are tested to EN, ISO, ANSI or NIOSH standards for the complete item.

MAIN COMPONENT CATEGORIES

EYE PROTECTION Goggle frames, spectacle frames, temples, side shields	FACE PROTECTION Browguards, headgear, visor clamps, pivots	RESPIRATORY Half-mask housings, cartridges, valve seats	HEAD PROTECTION Hard hat harness, cradle, ratchet parts
HEARING Ear defender cups, headband arms, plug parts	FOOT PROTECTION Composite toe caps, midsole plates	FALL ARREST Strap keepers, back plates, connector guards	WELDING Helmet shells, ADF cartridge housings

MOULDED HERE, MADE ELSEWHERE

- Frames, headgear, housings, harness parts, cups and toe caps are injection moulded.
- Standard visors are formed from extruded PC sheet; moulded visors are a separate line.
- Silicone facepieces and valve diaphragms are elastomer or LSR parts.
- Load-bearing fall-arrest buckles and D-rings are metal.

TYPICAL MANUFACTURING CHALLENGES

- Any resin, colourant or tool change can mean re-testing.
- Soft-to-rigid bonds on two-material parts.
- Glass-filled nylon parts whose strength depends on gating.
- Tiny sealing parts that must match cavity to cavity.

WHERE MOULDING SITS IN THE PPE CHAIN

RESIN certified grade, colour	TOOLING frozen at certification	INJECTION MOULDING frames, housings, caps	ASSEMBLY lenses, filters, straps	TYPE TEST impact, leak, load	PRODUCTION CONTROL batch and lot records	DISTRIBUTION marked product
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KEY REQUIREMENTS FOR PPE PARTS

CERTIFIED DESIGN The complete product is certified, so parts are frozen with it.	IMPACT Eye protectors are graded by steel-ball impact speed ^[4] .	SEALING Respirator leakage includes face seal and valve leakage ^[5] .
LOAD TRANSFER Toe caps take a 200 J impact and 15 kN compression ^[3] .	SKIN CONTACT Face seals, nose pads and cushions touch the wearer.	TRACEABILITY Date and lot coding on shelf-life items.

SECTION 02 · COMPONENTS

MAJOR INDUSTRIAL SAFETY & PPE COMPONENTS

The protective equipment parts covered by this guide, their materials and what each asks of the moulding process.

COMPONENT	APPLICATION	MATERIAL(S)	INJECTION MOULDING CONSIDERATIONS
Safety goggles frame	Sealed eye protection	Soft PVC, TPE/TPU, PP, PC, PA	Soft seal body on a rigid lens carrier: two-shot or two tools plus assembly. Vent geometry is frozen at certification.
Face shield (browguard, headgear, visor)	Face protection over glasses or goggles	PP, ABS, PA6 (brow, headgear); PC, cellulose acetate (visor)	Visors are usually formed PC sheet. Moulded parts are browguard, headgear, pivots and clamp, which must outlast many visors.
Respirator housing (facepiece, cartridge housing, valve body)	Half-mask respirators	PP, TPE/TPV, ABS, PC, PA6	Silicone facepieces are LSR work. Leakage depends on seal-face flatness and valve seats. Filter interfaces held tight.
Safety spectacle frame, temple, side shield	Spectacle eye protection	PC, TR90/nylon, PP, TPE (pads, tips)	PC and nylon for impact tests. TPE nose pads and temple tips overmoulded. Lens is a separate optical part.
Hard hat harness, cradle, ratchet	Helmet suspension	HDPE, PP, PA6, POM	Harness transfers impact energy and is tested with the helmet. POM for the ratchet. Ageing and UV tested with the shell.
Ear defender cup, headband arm, plug parts	Hearing protection	ABS, PP, PA6-GF, TPE	Cup wall, volume and seal set attenuation, so a size change needs re-testing. Arms hold spring force over many cycles.
Filter cartridge housing, bayonet connector	Respirator filters	PP, ABS, PC, PA6	Sealing rib and bayonet lugs are critical. Chemical resistance at service temperature. Date and lot coding.
Exhalation / inhalation valve seat, diaphragm carrier	Respirator valves	PP, POM, PC, TPE (diaphragm)	Seat flatness sets breathing resistance and leakage. High cavitation with tight cavity-to-cavity match.
Visor clamp, pivot, ratchet headgear	Face shield mechanism	PA6-GF, POM, ABS, PP	Holds the visor square through repeated flip-up. POM ratchet; glass-filled nylon on loaded pivots.
Safety footwear toe cap, midsole plate	Composite toe and underfoot protection	PA6-GF, PA66-GF, PP-GF, TPU	Certified structural part. Fibre orientation and gate position decide burst; condition parts before testing.
Harness, buckle, fall-arrest hardware parts	Fall-arrest harnesses	POM, PA66-GF, TPU, ABS	Load-bearing buckles and connectors are metal; moulded keepers, plates and guards. Confirm no moulding is in the arrest load path.
Welding helmet shell, ADF cartridge housing	Welding face protection	PA6-GF, PP, ABS, PC	Heat and spatter decide the grade. ADF housing holds the optical stack square and dust-sealed.

Lenses, standard visors, filter media, silicone facepieces, diaphragms and metal fall-arrest hardware are outside this guide.

GROUPING BY MOULDING DEMAND

PRECISION SEALING PARTS

Valve seats, cartridges, bayonets.
Cavity match, flatness, coding.

TWO-MATERIAL PARTS

Goggle frames, nose pads, temple tips, face seals. Bond pairs and second shots.

STRUCTURAL PARTS

Toe caps, midsoles, pivots, harness parts. Glass-filled grades and gating.

SECTION 03 · MATERIALS

MATERIALS USED FOR INDUSTRIAL SAFETY & PPE COMPONENTS

PPE combines tough rigid resins for impact and load with soft resins for seal and comfort, often in the same part.

MATERIAL	TYPICAL COMPONENTS	RELEVANT PROPERTIES	PROCESSING CONSIDERATIONS	LIMITATIONS TO CHECK
PC	Goggle and spectacle frames, visors, housings, cartridges, valve seats, ADF housing	High impact strength, clear or tinted.	Dry thoroughly; high melt temperature; low moulded-in stress.	Chemical and solvent stress cracking.
PA6, PA66, glass-filled PA, TR90	Toe caps, midsole plates, clamps, pivots, cups, headgear, welding shells, buckles	Strength, stiffness and heat resistance; GF grades for load.	Must be dried ^[10] ; fibre orientation follows the gate.	Properties shift with moisture; condition before testing.
PP, PP-GF	Browguards, headgear, housings, valve seats, harness, midsole plates	Light, tough, chemical resistant.	Easy to mould; shrinkage and warpage.	Low-temperature impact and UV ageing.
HDPE	Hard hat harness and cradle	Tough and flexible.	High shrinkage; hold dimensions at slots.	Ageing and UV with the shell.
ABS	Browguards, housings, cups, cartridges, welding helmets, back plates	Rigid, good finish.	Needs drying; good for textured surfaces.	Heat near the arc; chemical contact.
POM	Ratchets, valve seats, buckles, keepers	Stiff, low friction; used for pumps and valves ^[9] .	Never process in the same barrel as PVC ^[9] .	Not recommended outside pH 4 to 9 ^[9] .
TPE, TPV, TPU	Face seals, facepieces, nose pads, temple tips, cushions, diaphragms, midsoles	Soft, sealing, comfortable.	Bond grade matched to the rigid substrate.	Skin contact data; bond strength.
Soft PVC	Goggle face seal body	Flexible seal.	Heat-sensitive melt; separate from POM.	Plasticiser migration; skin contact data.
Cellulose acetate	Face shield visors	Clear visor material.	Usually sheet, not moulded.	Heat and impact limits.

General material behaviour only. The certified grade and colourant for each part come from the product's certification file.

MATCHING MATERIAL TO THE PROTECTION

PROTECTION	LOAD OR HAZARD	MATERIALS IN THIS GUIDE
Eye and face	Particle impact, splash, heat	PC, PA, PP, ABS, TPE, soft PVC
Respiratory	Sealing, breathing, chemicals	PP, PC, ABS, POM, TPE/TPV
Head and hearing	Impact transfer, spring force	HDPE, PP, PA6, PA6-GF, ABS, POM
Foot and fall	Impact, compression, straps	PA6-GF, PA66-GF, PP-GF, TPU, POM

ONE GRADE, ONE CERTIFICATE

A new colour masterbatch or an alternative resin supplier is a design change on a certified product. Agree the grade list with the brand owner before production starts.

MATERIAL SELECTION QUESTIONS

- ☐ Which standard and impact class apply?
- ☐ Is the part in skin contact?
- ☐ Is it two-shot, overmoulded or assembled?
- ☐ Will it see heat, UV or chemicals in use?

SECTION 04 · DESIGN & MOULD

COMPONENT DESIGN & MOULD REQUIREMENTS

PPE moulds hold small sealing and locking features to tight size, and often join a soft and a rigid material in one part.

DESIGN FEATURES THAT AFFECT MOULDING

FEATURE	WHY IT MATTERS IN PPE	MOULDING IMPLICATION
Sealing faces and valve seats	Respirator leakage includes face seal and valve leakage ^[5] .	Flatness and size held across all cavities.
Soft-to-rigid joints	Goggle seals, nose pads, temple tips.	Two-shot or overmould; bond grade and surface.
Bayonets and locking lugs	Filter compatibility depends on them.	Tight tolerance; wear-resistant steel.
Ratchets and detents	Headgear and helmet fit, visor retention.	Tooth form and POM shrinkage control.
Structural walls	Toe caps and plates take 200 J and 15 kN ^[3] .	Gate position, fibre orientation, weld lines.
Vents and optics seats	Goggle vents and ADF stacks.	Small features filled every shot; square seats.
Moulded coding	Filters and cartridges carry date and lot.	Date inserts or laser marking.

MOULD CONSIDERATIONS

ITEM	PPE POINTS	ITEM	PPE POINTS
Cavity layout	Valve seats, pads: 8 to 32. Frames, cups: 1 to 4. Toe caps: left and right pairs.	Two-shot	Rotary or core-back moulds for seals and pads.
Runner	Balanced or hot runners for small precision parts.	Steel	Wear-resistant steel for glass-filled nylon.
Gating	Structural decision on glass-filled parts.	Surfaces	Polished optics seats; textured grips.
Cooling	Thick toe caps set the cycle ^[8] .	Changes	Tool changes may need product re-testing.

TOOL CONTROL ON CERTIFIED PARTS

Tool maintenance on a certified part is part of quality control. Record every repair to a lug, seat, vent or gate and check the affected dimensions before release.

FROZEN DESIGN	CHANGE CONTROL	CAVITY ID	SPARE INSERTS
Keep drawings, grade and tool revision on record.	Agree tool repairs that touch functional features.	Mark cavity numbers to trace a failing part.	Hold spares for wear points such as lugs.

SECONDARY OPERATIONS THAT SHAPE THE MOULD

OPERATION	TYPICAL PARTS	WHAT IT ASKS OF THE MOULDED PART
Lens, visor and filter fitting	Goggles, spectacles, face shields, cartridges	Grooves, clips and seats to size.
Valve and diaphragm assembly	Respirator valve seats and carriers	Flat seats and retention pins.
Strap, cushion and pad fitting	Ear defenders, headgear, harness parts	Slots and snap fits that survive assembly.
Coding and marking	Cartridges, housings, helmets	Flat areas for date wheels or laser marks.

SECTION 05 · PRODUCTION PLANNING

PRODUCTION CAPACITY & CYCLE-TIME PLANNING

PPE plants run small precision parts in many cavities and thicker structural parts in few. Assemblies need every part in matching numbers.

OUTPUT

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

Effective/hour = Parts/hour × Utilisation

Day = Effective/hour × Hours run

Utilisation covers colour and variant changes, start-up, maintenance and rejects.

EXAMPLE 1 · 16-CAVITY PP VALVE SEAT

16 × 3600 ÷ 12 s = 4,800 /h
× 0.85 utilisation = 4,080 /h
× 22 h = 89,760 /day
× 26 days = 2,333,760 /month

EXAMPLE 2 · PA66-GF TOE CAP, 2 CAVITIES (1 PAIR)

2 × 3600 ÷ 45 s = 160 /h
× 0.85 = 136 /h · × 22 h = 2,992 /day
× 26 days = 77,792 caps = 38,896 pairs / month

Working backwards: for 60,000 pairs (120,000 caps) a month in 572 running hours you need 210 caps per hour. Cavities = 210 × 45 ÷ (3600 × 0.85) ≈ 3.1, so a 4-cavity (two-pair) mould or a second machine.

Illustrative example. Cycle times of 12 s and 45 s, 85% utilisation, 22 h per day and 26 days per month are assumptions. Actual requirements depend on the component, material, mould and production conditions.

WHAT SETS THE CYCLE TIME

PHASE	PPE INFLUENCE
Injection & hold	Packing thick toe caps and flat seats.
Cooling	Usually the largest share; rises roughly with wall thickness squared ^[8] .
Second shot	Two-shot parts add a rotation and fill.
Removal	Delicate frames and pads handled by robot.
Drying	Nylon and PC lots dried before use.

BALANCING CAVITIES, CLAMP FORCE AND OUTPUT

PP VALVE SEAT MOULD	PROJECTED AREA	CALCULATED FORCE	RATED AT 85%	SHOT	EFFECTIVE OUTPUT
8 cavities	57 cm ²	23 t	27 t	24 g	2,040 /h
16 cavities	113 cm ²	46 t	54 t	48 g	4,080 /h
32 cavities	226 cm ²	91 t	107 t	96 g	8,160 /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^[7], about 0.28 to 0.42 t/cm²; K = 0.35 t/cm² and S = 1.15 assumed. Also assumed: 30 mm seat, 7.07 cm² and 3 g per part, hot runner with no runner waste, 12 s cycle, 85% utilisation. More cavities also means more cavities to keep matched.

MATCHING AN ASSEMBLY

Complete products/month = lowest of (each part per month ÷ parts per product)

A respirator needs housings, two cartridges, valve seats and buckles in step. Plan the slowest part first.

Toe caps run in left and right pairs across a size range, so machine hours come from the whole size mix. Frames and headgear often share one mould base across colours, which turns colour changes into the main planned stop.

MACHINE UTILISATION AND PLANNED DOWNTIME

COLOUR CHANGES

Hi-vis and brand colours on headgear and frames.

VARIANT CHANGES

Vented, non-vented and size variants.

DRYING TIME

Nylon and PC dried before each run^[10].

DEMAND PEAKS

Project orders from plants and sites.

SECTION 06 · AUTOMATION

AUTOMATION & PRODUCTION EFFICIENCY

In PPE, automation mostly protects consistency: parts that are not handled, mixed or scratched cause fewer batch problems.

AUTOMATION	WHERE IT ADDS VALUE IN PPE	WHEN IT USUALLY MAKES SENSE
Robot take-out	Removes frames, cups and visors without scratches.	Cosmetic and optical parts.
Cavity-separated collection	Keeps valve seats and pads by cavity.	Precision sealing parts.
Two-shot or overmould handling	Transfers rigid parts for the soft shot.	Goggle seals, nose pads, temple tips.
Vision inspection	Checks short shots on vents, teeth and lugs.	High-cavity precision parts.
Leak and flatness testing	Checks valve seats and housings.	Respirator components.
Date and lot marking	Codes filters and cartridges.	Shelf-life limited items.
Dryer and dosing	Controls moisture and colour share.	Nylon, PC and coloured parts.

Two-shot moulding removes an assembly step but needs the product designed for it. Otherwise, overmoulding with robot transfer is the usual route.

AUTOMATION BY PRODUCT GROUP

PRODUCT GROUP	MAIN AUTOMATION	WHY
Goggles and spectacles	Two-shot, robot take-out	Soft seals, scratch-free frames
Respirator parts	Cavity separation, leak test, coding	Sealing and traceability
Toe caps and plates	Dryer control, robot take-out	Heavy parts, moisture-sensitive
Headgear and harness	Sprue picker, assembly	Many small parts per product

DECIDING ON AUTOMATION

CERTIFICATION Repeatable handling keeps certified batches consistent.	SURFACE Optical and visible parts scratch when dropped in bins.	MIX-UPS Left and right, sizes and variants must not mix.
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INTERFACES TO SPECIFY ON THE MACHINE

ROBOT Signal interface and safety interlocks.	TWO-SHOT Second unit, rotary table or core-back.	PROCESS DATA Shot data per batch for records.	AUXILIARIES Dryer, dosing, hot runner and coder links.
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WHERE THE COST OF A MOULDED PART COMES FROM

MATERIAL certified grades	MACHINE per machine hour	LABOUR handling, assembly	POWER kWh per part	MOULD variants, two-shot	REJECTION cosmetic, leaks	TESTING batch checks
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Small precision parts are driven by machine hours and rejection; toe caps and shells by resin and cooling time. Use your own rates to compare options.

SECTION 07 · QUALITY

QUALITY, TESTING & COMMON DEFECTS

A PPE part fails its purpose silently: it looks right until a steel ball, a falling load or a leak test finds the weakness.

TESTS AND CHECKS

CHECK	WHAT IT INVOLVES	LINK TO MOULDING
Eye impact (EN 166)	Steel ball at 45 m/s (F), 120 m/s (B) or 190 m/s (A); spectacles are limited to F ^[4] .	Frame strength, weld lines, lens retention
Face shield visor	Sheet PC visors reach grade B; moulded visors need at least 1.5 mm to do the same ^[6] .	Visor wall thickness, clamp retention
Respirator leakage (EN 149)	Total inward leakage of 22%, 8% or 2% for FFP1 to FFP3, including valve leakage ^[5] .	Valve seat flatness, seal faces
Exhalation resistance	Not above 3 mbar at 160 l/min for EN 149 masks ^[5] .	Valve seat and vent geometry
Toe cap	Impact of at least 200 J and compression of at least 15 kN ^[3] .	Fibre orientation, gate, conditioning
Helmet	IS 2925 testing and ISI mark for industrial helmets in India ^[1] .	Harness strength, ageing
Dimensional	Bayonets, lugs, ratchets, cup volume.	Shrinkage, cavity match

Test methods and limits come from the applicable standard. Several were read through secondary sources; confirm the current edition and the certifying body's requirements.

IN-PROCESS CONTROLS

WEIGHT BY CAVITY Flags imbalance on small parts.	FLATNESS Valve seats and seal faces.	BOND PULL Soft-to-rigid joints on two-shot parts.	MOISTURE Nylon and PC before moulding ^[10] .
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TROUBLESHOOTING COMMON DEFECTS

DEFECT	POSSIBLE CAUSES	EFFECT ON THE PPE	AREAS TO INVESTIGATE
Weld line cracks in frames	Flow fronts meeting at lens seats	Fails impact test	Gate position, melt and mould temperature
Brittle toe caps	Wet nylon, fibre breakage, poor orientation ^[10]	Fails 200 J impact	Drying, screw design, gate
Warped valve seats	Uneven cooling, early ejection	Leakage, resistance	Cooling, hold time, cavity balance
Soft layer peeling	Wrong bond pair, cold substrate	Seal loss, discomfort	Grade pairing, substrate temperature
Short shot on vents or teeth	Small features, poor venting	Function and fit failure	Venting, injection speed
Splay on PC	Moisture	Visual reject, weaker frame	Drying
Flash on lugs	Worn shut-offs, low clamp	Poor fit with filters	Parting line, clamp setting
Ratchet slipping	Tooth form out of size, POM shrinkage	Headgear loosens in use	Hold pressure, cooling, tooth wear
Colour shift	Masterbatch or dosing change	Batch mismatch	Dosing control, approved colourants

SECTION 08 · WORKED EXAMPLES

PRACTICAL MACHINE-SELECTION EXAMPLES

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

A · PA66-GF COMPOSITE TOE CAP		STRUCTURAL
APPLICATION · MATERIAL	Safety footwear toe cap · glass-filled PA66	
CHARACTERISTICS	Thick curved shell; 200 J and 15 kN tests ^[3]	
CAVITIES · OUTPUT	2 (one pair) · about 136 per hour at 45 s (Section 05)	
MOULD CONSIDERATIONS	Gate for fibre orientation, wear-resistant steel, cooling	
SECONDARY	Conditioning before test, pairing L and R	
EVALUATE Tonnage needs projected area and grade data. Shot consistency, a screw suited to glass-filled nylon and reliable drying decide the choice. STILL NEEDED CAD model, grade data, size range, volume per size.		

B · PP RESPIRATOR VALVE SEAT		PRECISION, HIGH CAVITY
APPLICATION · MATERIAL	Exhalation valve seat · PP	
CHARACTERISTICS	About 3 g, 7.07 cm ² projected area (assumed); flat seat	
CAVITIES · OUTPUT	16 · about 4,080 per hour at 12 s (Section 05)	
MOULD CONSIDERATIONS	Balanced hot runner, cooling for flatness	
SECONDARY	Cavity-separated collection, flatness check	
EVALUATE The Section 05 table gives about 46 t calculated and a 48 g shot, so a clamp rated around 54 t or more. Shot repeatability and cavity match matter more than tonnage. STILL NEEDED CAD projected area, flatness limit, volume.		

C · TWO-MATERIAL GOGGLE FRAME		TWO-SHOT OR OVERMOULD
APPLICATION · MATERIAL	Goggle frame · PC or PA carrier with TPE seal	
CHARACTERISTICS	Lens groove, vents, soft face seal	
CAVITIES · OUTPUT	1 or 2 · set by frame and seal shots	
MOULD CONSIDERATIONS	Rotary or core-back tool, bond grade, vents	
SECONDARY	Lens and strap fitting	
EVALUATE Two-shot needs a second injection unit sized for the soft shot and a rotary or core-back mould. Otherwise, two machines and robot transfer. STILL NEEDED drawings, bond pair data, certification status, volume.		

In each case, the certified design fixes the grade and the mould. The machine choice follows from how that grade must be processed and how many cavities must be kept matched.

WHAT DECIDED THE MACHINE IN EACH EXAMPLE

SELECTION FACTOR	A · TOE CAP	B · VALVE SEAT	C · GOGGLE FRAME
Main limit	Glass-filled nylon processing	Cavity match, cycle	Two materials
Clamp force	Needs projected area	About 54 t rated	Needs projected area
Auxiliaries	Dryer, robot	Hot runner, separation	Second unit, 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 a PPE component.

COMPONENT

- ☐ 2D drawing and 3D CAD model
- ☐ Part weight and wall thickness
- ☐ Certified grade and colourant
- ☐ Critical dimensions and seal faces
- ☐ Soft and rigid material pairs
- ☐ Coding or marking needed

PRODUCTION

- ☐ Monthly volume per variant and size
- ☐ Parts per assembled product
- ☐ Cavity count and target cycle time
- ☐ Operating hours and shifts
- ☐ Batch and lot size
- ☐ Colour and variant range

MOULD

- ☐ New or existing mould; size and weight
- ☐ Two-shot, overmould or insert
- ☐ Hot runner and gating
- ☐ Steel for glass-filled grades
- ☐ Previous machine specification, if any
- ☐ Tool revision on the certificate

PPE APPLICATION

- ☐ Product standard and class
- ☐ Certification body and status
- ☐ Skin contact requirements
- ☐ Heat, UV or chemical exposure
- ☐ Traceability and coding
- ☐ Export markets and standards

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 PPE
1	What shot repeatability does the machine hold at my shot size?	Valve seats and cavity match.
2	Is a screw and barrel suited to glass-filled nylon available?	Toe caps, pivots, welding shells.
3	Can a second injection unit or two-shot setup be added?	Goggle seals, nose pads, temple tips.
4	How many hot runner zones and core circuits are available?	Multi-cavity precision parts.
5	Which robot interfaces and interlocks are supported?	Scratch-free take-out and transfer.
6	Can the control log shot data by batch?	Certified product records.
7	Can settings be stored for each variant and colour?	Frequent variant changes.
8	How are process settings locked against changes?	Frozen certified process.
9	What is the energy use per part at my cycle?	Cost per small part.
10	What installation, training and spare-parts support is included?	Steady supply to brand owners.

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 · other requirements such as the certification standard, two-shot or overmoulding.

sales@pratishnaengineers.com · +91-22-66970281 / 82 · www.pratishnaengineers.com

A1-4, Vaibhav Ind. Premises, Opp. Oxford Chambers, Saki Vihar Road, Andheri (E), Mumbai 400 072, India

TECHNICAL REFERENCES

- [1] ERA Global Standards Certification - Industrial safety helmets (IS 2925:1984) under the Helmet (Quality Control) Order, 2023 - <https://www.eraglobal.co.in/industrial-safety-helmets/>
- [2] iKargos - BIS certification for footwear, including the Personal Protective Equipment - Footwear (Quality Control) Order 2020 - <https://app.ikargos.com/services/certification/bis-certification-for-footwear-27>
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