

*Driving Valve through  
Performance, Products & Processes*

A TS 16949-ISO 9000 Company



## Perfect Engine Components





**Strategic long term  
Commercial &  
Technical  
Collaboration  
with  
TRW Automotive  
GmbH**

## Cutting-Edge Technology

Our plant is equipped with state-of-the-art machinery and forging process constituting of 'Extrusion Technology'.

### Raw Material

Mild Steel,  
Alloy Steel,  
Bearing Quality Steel,  
Stainless Steel,  
Cast Iron & SG Iron

### Raw Material Forms

Rolled Bars (3/4" to 8"),  
Forgings (Open Die, Closed die,  
upset (4kg to 27 kg),  
Castings (CI & SGI),  
Cold Drawn Seamless Tubes

### Surface / Heat Treatment

- Annealing
- Normalizing
- Hardening and tempering
- Carburizing
- Nitro Carburizing
- Liquid Nitriding
- Gas Nitriding
- Solution Hardening
- Induction Hardening
- Hard Chrome Plating
- Nickel Plating
- Plasma Arc deposition

### Critical Machining Processes

Hard Turning, Grinding, Lapping,  
Super Finishing, Internal & External  
spherical Forms.

## Growth Through Customer Satisfaction

Perfect Engine Components P. Ltd (PEC) has been manufacturing Engine Valves, Valve Seat Inserts & Valve Guides for all types of Automotive engines, Captive Power, Transport Industry, Locomotive and Marine Engine. Ranging from Motor Cycles, Three Wheelers, LCV, HCV, Power Generation, Locomotive and Marine Engines etc. The Valve plant (erstwhile Auto field Engineering) was established in 1983, as a Joint Venture Company with Atlas Inc., Ohio, USA, a subsidiary of Cummins Engine Company, USA. We are led by a new group of professionals with significant experience in Automotive Industry and Diesel Engines. We also have a dedicated team of young and energetic technocrats to ensure the delivery of right products by making sure the application of latest techniques and cent percent quality control.

We have 2 different units for our products, one for Engine Valves and the other for Valve Seat Inserts and Valve Guides. All units are individually well equipped with special purpose machines and latest advanced technology, testing, R&D and inspection department. We have Cutting-edge Technology for Extrusion Forging, Forging and Casting, Induction Hardening and annealing Plants. We use material to match customer's specification and requirement / application.

We are catering OE domestic as well as International market with supplies to various countries like USA, Germany, Turkey, Middle East etc.

## Vision

To be the most admirable and preferred supplier to all our customers.

## Mission

To provide unique solutions to our customers by anticipating and understanding their business objectives and aligning them with ours.

## Policy

We, at PEC shall consistently achieve & exceed Customers' expectations through quality of our Products & Services.

## Values

- Customer first
- Quality in everything we do
- Ethical and transparent Business practices
- Continuous development of our Human Resources
- People making the difference
- Treat all stake holders as partners
- Environment, Health & Safety
- Respect for Human dignity and relationships





## Manufacturing Prowess

Perfect Group has world class manufacturing facility, one for engine valve which located in Sahajpur, about 40 kms east of Pune and the second plant is for Valve guides and Valve Seat Inserts which is located in Lonavala, about 60 kms west of Pune.

Both facilities are having latest technology in all aspects of manufacturing such as casting, machining, grinding, lapping, surface treatment and testing, as enabled the company to meet all required standard. The company firmly believes in manufactured quality through stringent process control. Our facilities are spread over a built-up area close to 350,000 Sq. Ft.



### Machining Facility

- CNC turning machines with good stability & accuracy
- **Grinding Machines:**  
Face grinding, Duplex grinding & Centerless grinding machines to meet dimensional accuracies and consentient Cp / Cpk values > 1.67



### Material Quality Control

- Quality Check and acceptance of Material at Incoming stage
- Verification of Chemistry of each batch stage
- Material movement in bins during processing along with a Route Card
- Batch code Etched on each product for positive traceability



### Metrological & NDT Capabilities

- Checking on highly precise instruments like Coordinate Measuring Machine, Roundness Tester, Surface Finish Tester, Contracer, Profile projector etc.
- 100% inspection for crack detection of valve seat insert, through magnetic particle inspection for magnetic parts & Zyglo inspection for non - magnetic parts

### Additional Facilities

- Induction Hardening
- Stellite Welding by Plasma Arc deposition
- CNC Friction Welding
- Projection Welding
- Metco Coating





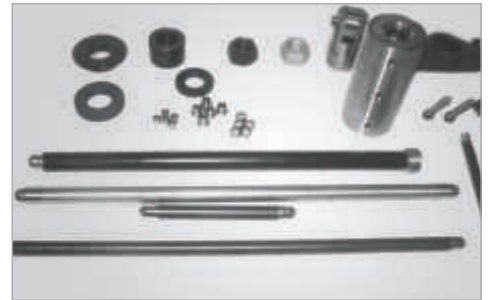
## Versatile Product Range



Valve Seat Inserts



Valve Guides



Engine Overhead Parts

## Engine Valves Product Specification

**Manufacturing Technology** Extrusion Forging & Upset Forging

### Size Range

Stem Diameter	5 to 29 mm
Head Diameter	15 to 138 mm
Total Length	50 to 450 mm

### Material Grades

Austenitic Steel	En52, SUH3, SUH11
Martensitic Steel	21-2N, 21-4N, 23-8N, 21-12N
Super Alloys	Nimonic, Inconel
Plasma Deposit Hard facing using PTA technology	Ni60, Stellite 6 & 12, F, Etonite, Triballoy - 400 & 800, Colmonoy 56

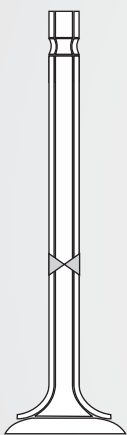
### Bi-metallic Valves

Using Friction welding technique, variety of above mentioned materials combinations can be produced.

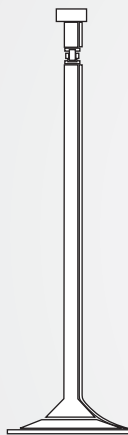


Engine Valves

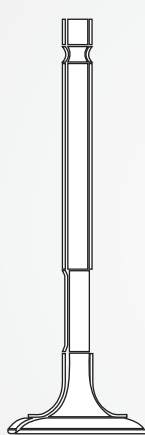
## Valve Types



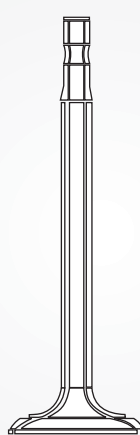
Friction Welded



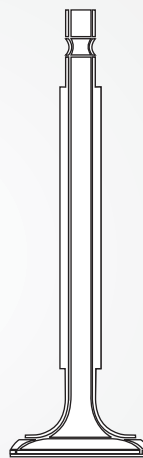
Stellite Tip & Seat



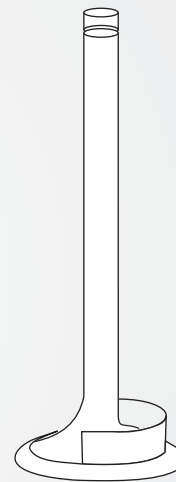
With Scraper



Reduced Stem



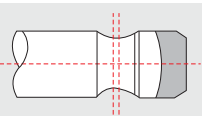
Chrome Plated



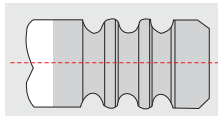
Shrouded



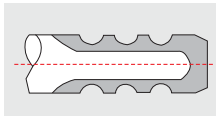
Nitrided



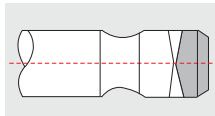
Tip End Hardened



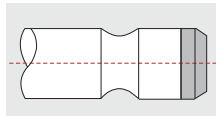
Tip End Thru Hardened



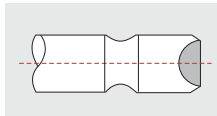
Tip & Groove Pattern Hardened



Wafer Welded



Stellite Tip (Flat)



Stellite Tip (Cavity)

## Valve Seat Insert Product Specification

**Manufacturing Technology** Shell Molding

### Size Range

Outer Diameter	25 to 120 mm
Inner Diameter	20 to 120 mm
Total Length	5 to 30 mm

**Manufacturing Technology** Centrifugal

### Size Range

Outer Diameter	122 to 300 mm
Inner Diameter	100 to 280 mm
Length	up to 450 mm

### Heat Treatment Technology

Annealing, Normalizing, Hardening and Tempering, Carburizing, Gas Nitriding, Induction Hardening

### Machining Technology

Duplex Grinding, Surface Grinding, Centreless Grinding, CNC Turning, VMC, HMC, Laser Marking.



## Valve Guide product specification

### Manufacturing Technology

**Size Range** Shell Molding

Outer Diameter	10 to 100 mm
Total Length	20 to 250 mm
Inner Diameter	5 to 50 mm

### ID Machining Technology

Gun drilling, Reaming, Oil groove, honned, Nitride, Hardened Lubrited

### ID Machining Technology

Cast Iron	with Cr, Cu, P, Ni, Mo
Plain Cast Iron	
Sintered	

## Material Grades

	%Mo	%Cr	%Ni	%Ph	%W	%V	Hardness-Hrc	Application
ALLOY CI - 01	1 - 1.3	0.10 - 2	0.25 - 0.5	0.3 - 0.8	NA	NA	40 - 50	Inlet vsi small/medium engines
Cr STEEL -01	2 - 2.5	12 - 14	NA	NA	NA	NA	29 - 34	Inlet / Exh medium engines
Cr STEEL -02	NA	19 - 21	1 - 1.6	NA	NA	NA	42 - 48	Inlet medium engines
Cr STEEL -03	2 - 2.5	30 - 35	NA	NA	NA	NA	37 - 43	Inlet / Exh medium duty engines
TOOL STEEL	6 - 7	3.5 - 4.5	NA	NA	5.5 - 6	1.3-1.7	38 - 48	Exh of medium duty engines
	%Mo	%Cr	%Co	%Fe	%w	%Ni	—	—
WELTITE	5 - 7	12 - 14	NA	BASE	NA	40-44	32 - 38	Inlet of heavy duty engines
ETONITE	9 - 11	25 - 28	9 - 11	9 - 14	9. - 11	BAL	45 - 55	Exh of heavy duty engines
55 Cr-45Ni Gr	NA	55	45	NA	NA	NA	42 - 48	Inlet/Exh heavy duty/marine engines
TRIBALLOY	26 - 29	7.5 - 8.5	BASE	3 max	NA	3 max	50 min	Inlet/Exh heavy duty/marine engines
STELLITE	NA	29 - 32	BASE	3 max	11. - 14	3 max	50 - 55	Inlet/Exh heavy duty/marine engines

## Design Material Science

Testing Capabilities for material properties essentials for optimal performance of Valves & Seat Inserts:

- Compressive yield strength
- Hot hardness
- Thermal expansion
- Elevated temperature stability
- Thermal conductivity
- Machinability
- Corrosion resistance
- Wear resistance

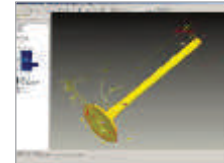
## CAD / Product Design

### Software Capabilities

- Pro/Engineer Wildfire 2.0, 3.0, & 4.0
- CATIA V5 R18
- UGNX3 & UGNX5
- IDEAS NX5
- AutoCAD 2004
- Pro/Intralink 3.0
- PDM Link



Design & Available Space



Component Model



Component Drawing



## Awards & Recognition



## Key Customers



**Perfect Engine Components Pvt. Ltd.**

### Corp. Off. & Plant 1

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Email : [info@peclindia.com](mailto:info@peclindia.com) Web : [www.peclindia.com](http://www.peclindia.com)

### Plant 2

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