

## FREQUENTLY ASKED QUESTIONS

### What is Devlon V-API grade material?

Devlon V-API is part of the polyamide family but has additives which allow it to perform at higher pressures and temperatures than other grades of Nylon.

### What temperatures can it perform in?

Devlon V-API grade is fully cryogenic which allows it to perform at -193°C up to +200°C.

### What pressures can it handle?

Devlon V-API has been successfully tested up to 6,000 psi (414 bar) at a temperature of +176°C.

### Are there any concerns regarding chemical attack?

In general, Devlon V-API is a material which does not succumb easily to aggressive chemicals, however those which are aggressive to Devlon V-API are listed in this document.

### What benefits can be gained from introducing Devlon V-API?

By introducing Devlon V-API as a valve seat material, any future specifications that mention Nylon can effectively be replaced by Devlon V-API in the knowledge that it exceeds all temperature and pressure limitations of Nylon 6, Nylon 66, Nylon 6.12 and Nylon 12. Thereby inventory costs will be reduced.

### How does Devlon V-API compare price-wise with other Nylons?

Whilst slightly more expensive than Nylon 6 and Nylon 66, Devlon V-API is less expensive than Nylon 6.12 and Nylon 12.

Use of Devlon V-API eliminates seat material clarification by design due to the fact that it outperforms all other Nylon materials, therefore reducing costs at design stage.

### Can Devlon V-API be used to replace PTFE and glass-filled PTFE?

Devlon V-API has shown itself as a useful seat material at both high and low pressures. With its superior dimensional stability, lower cost and larger size range, Devlon V-API can effectively replace both virgin and filled PTFEs.

### What sizes are available?

Devlon V-API grade material is available in sizes ranging from 1" (25.4mm) diameter up to 88" (2,250mm) diameter.

### Does the material have any test certification?

Devlon V-API material has been approved by Shell for use as seat material in high pressure ball valves conforming with API 6D. Specification number MESC 77/130.

### Does Devlon V-API as a valve seat give rise to greater torque value?

When tested against other Nylon materials, Devlon V-API grade did not show any increase in torque setting and as such actuator capacity did not change. Also, breakout torque figures vary with valve design – to date it has not been a concern of the 100+ valve manufacturers currently using this material.

### Does the material absorb moisture?

As is the nature of polyamides, they are hygroscopic and will absorb a certain amount of moisture. Independent testing by ball valve manufacturers have determined a figure of 3% moisture absorption at saturation for Devlon V-API. This is predictable and in no way affects the material or valve performance.

### Can you name a few companies using Devlon V-API?

The material is specified and used extensively throughout the worldwide valve industry. Some of our end users are listed in this document.

DEVOL ENGINEERING LIMITED  
CLARENCE STREET  
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PA15 1LR

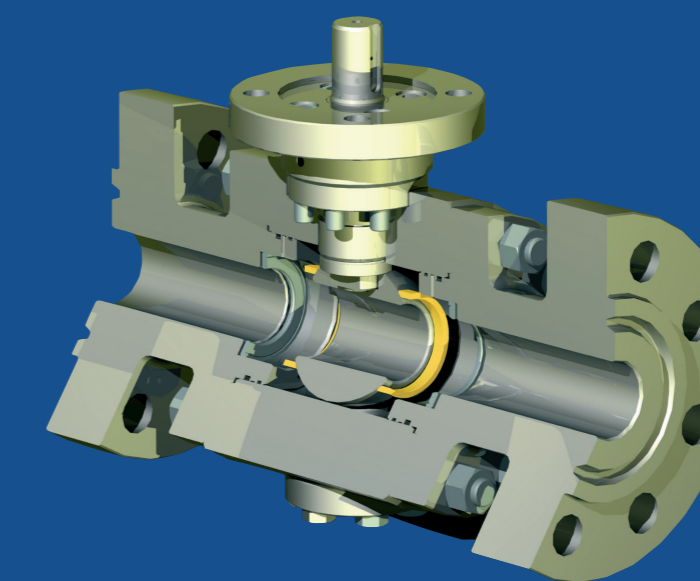
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# Devol®



**VALVE SEAT**  
TECHNICAL SPEC

## ADVANTAGE DEVLON V-API GRADE OPERATING LIMITS

Increasingly stringent restrictions on ball valve operating conditions over the years have meant the use of several thermoplastic materials to cover the required operating range for ball valve seat inserts. However "thermoplastic materials" can cover such a broad range of specifications that there was a certain amount of confusion and ambiguity throughout the valve industry whereby the customer did not know what their valve seat was either made of or capable of.

Valve manufacturers who were specifying either filled PTFE or Nylon as their soft seat material were not only restricting the design of their valves, but in some instances were wrongly interpreting "Nylon".

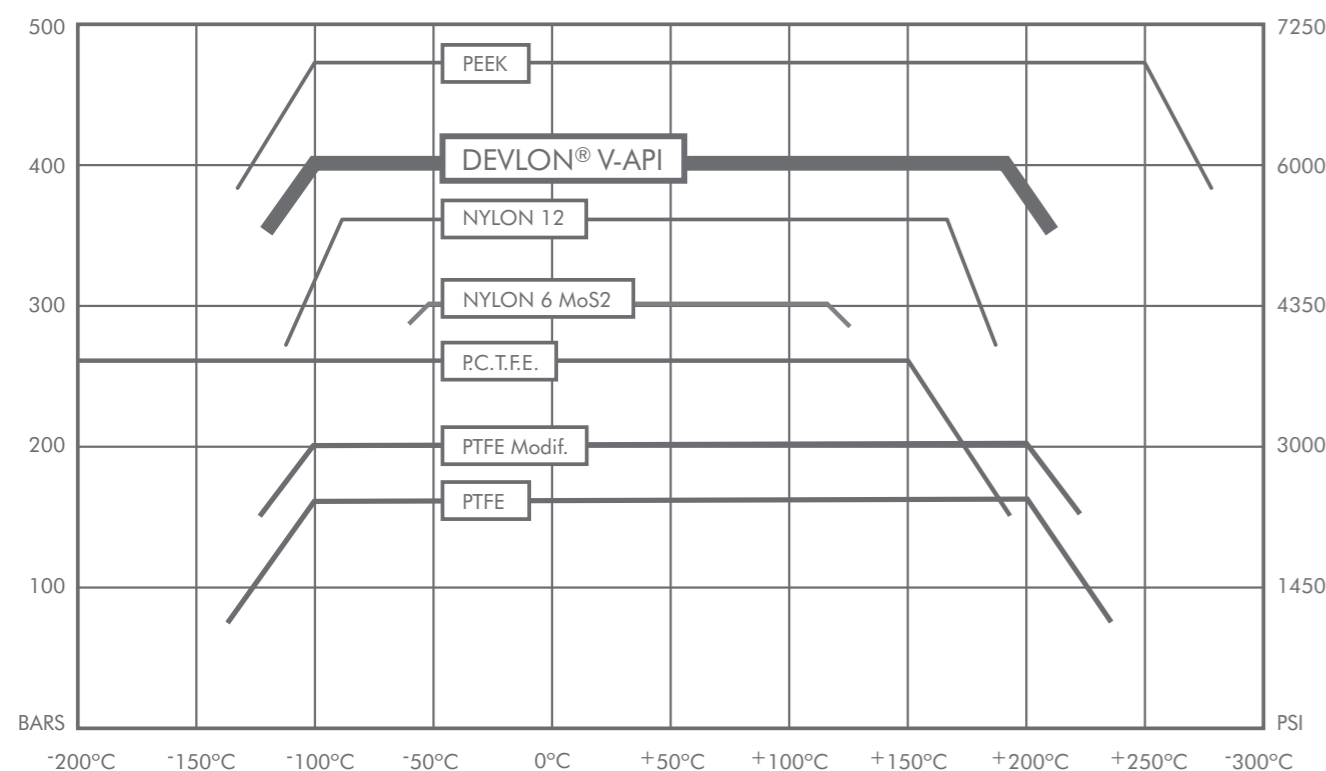
Working closely with a major valve manufacturer, Devol developed and introduced Devlon V-API grade as a superior valve seat material in the early 1980s and it has been widely specified by valve manufacturers ever since. Devlon V-API is also approved for use by major Oil and Gas producers such as Shell and BP.

Extensive tests were carried out by the University of Leeds covering the pressure range of 1, 7, 250 and 407 bar – the results of which are displayed on **Graph 1** below.

Furthermore, **Graph 2** shows the summary of identical comparative tests done on the same ball valve and clearly demonstrates the superiority of Devlon V-API over the more traditional glass reinforced PTFE.

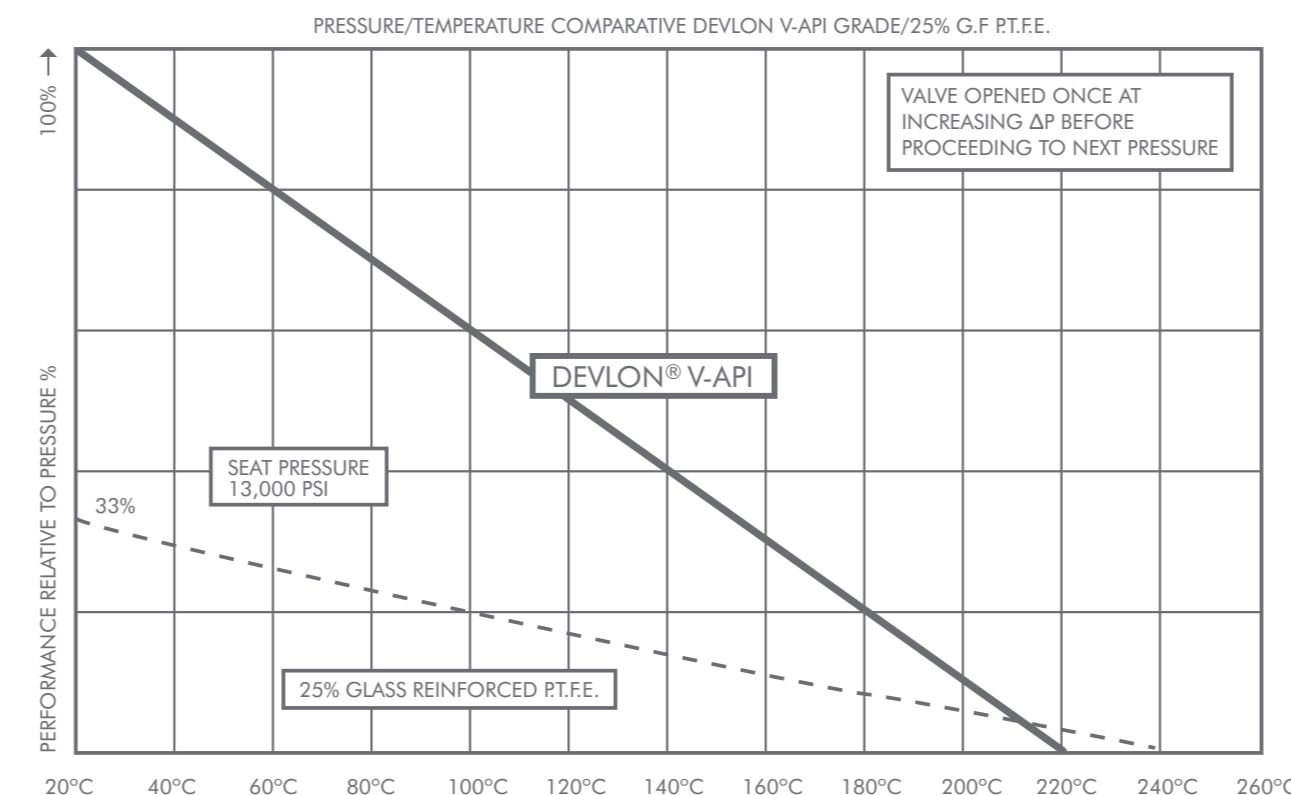
Further independent testing by several customers gives verification of zero leakage at low 7 bar pressure at ambient on return from temperature extremes.

Graph 1



Front page model courtesy of KVC (UK) Ltd.

Graph 2



### BENEFITS OVER NYLONS & PEEK

- Single material specification replacing several thermoplastics
- Superior pressure/temperature range
- Economical price structure
- Available in large diameters
- Cuts inventory costs

### BENEFITS OVER PTFE & GLASS REINFORCED PTFE

- Comparable friction values at low and high temperatures
- Suitable for high and low pressure valves
- Wider operating temperature range
- Superior dimensional stability
- Larger size range
- Lower cost

### VALVE CLASSES

| Devlon V-API is typically used in the following class of valves:- |                     |                        |
|---|---------------------|------------------------|
| CLASS   | TEST PRESSURE (psi) | WORKING PRESSURE (psi) |
| 150   | 425                 | 275                    |
| 300   | 1,100               | 720                    |
| 600   | 2,175               | 1,440                  |
| 900   | 3,250               | 2,160                  |
| 1500  | 5,400               | 3,600                  |
| 2500  | 9,000               | 6,000                  |

## MATERIALS AGGRESSIVE TO DEVLON V-API

Whilst Devlon V-API has good resistance to the majority of chemicals commonly specified in the oil and gas sectors there are, like all materials, some to which it has little or no resistance. These are listed in the table below:-

| ELEMENTS                        |                                    |                             |
|---------------------------------|------------------------------------|-----------------------------|
| Chlorine (gaseous, aqueous)     | Flourine                           | Iodine (alcoholic solution) |
| INORGANIC COMPOUNDS             |                                    |                             |
| <b>ACIDS</b>                    | <b>SALTS</b>                       | <b>OXIDISING AGENTS</b>     |
| Chromic acid (aqueous 10%)      | Ferric Chloride                    | Hydrogen peroxide (30%)     |
| Hydrofluoric acid (aqueous 40%) | Mercuric chloride (aqueous 6%)     | Potassium permanganate (1%) |
| Phosphoric acid (aqueous 2%)    | Thionyl chloride                   |                             |
| Nitric acid (aqueous 2%)        | Calcium chloride (20% alcohol)     |                             |
| Hydrochloric acid (aqueous)     |                                    |                             |
| Sulphuric acid (aqueous 2%)     |                                    |                             |
| ORGANIC COMPOUNDS               |                                    |                             |
| <b>ACIDS</b>                    | <b>AROMATIC HYDROXYL COMPOUNDS</b> |                             |
| Formic acid (aqueous 40%)       | Phenol (molten or aqueous)         |                             |
| Chlorosulphuric acid            | Resorcinol                         |                             |
| Trichloroacetic acid            | Cresol                             |                             |
| Acetic acid (aqueous 40%)       |                                    |                             |

### BENEFITS OF USING DEVLON V-API

- Ability to perform in temperature range of -193°C to +200°C
- Can withstand a pressure of 414 bar (6,000 psi) at +176°C
- Available in dimensions of 1" (25.4mm) to 88" (2,250mm)
- Has Shell approval (MESC 77/130) for use in high pressure valves conforming to API 6D
- Is specified by several OEMs
- Is cost effective

### A SAMPLE OF VALVE MANUFACTURERS SPECIFYING DEVLON V-API

|                    |                        |                |
|--------------------|------------------------|----------------|
| Tyco Flow Controls | Bel Valve              | Masterflo      |
| PBV-USA            | KF Industries Inc.     | Starline SpA   |
| Eseromatic         | Hindle Valves          | Dresser Italia |
| Kumkang Valve Co.  | Weir Hopkinsons        | Walthon Weir   |
| Sud Robinetterie   | Pibiviesse             | Wood Group     |
| Bestobell Valves   | Saint-Gobain Pipelines | Mapegaz        |
| Valvulas Worcester | Della Foglia           | Cooper Cameron |