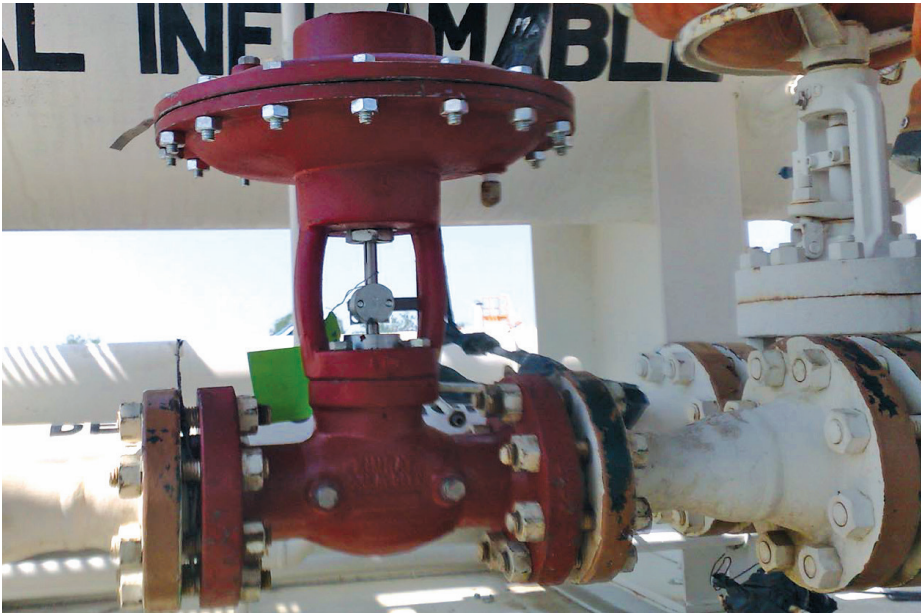


# ABRASIVE LIQUIDS LEVEL CONTROL PEMEX - NORTH REGION



## ENVIRONMENT

Field Fundadores 1 Reynosa, Tamaulipas  
Operating Conditions  
Pressure of Separators 800 psig  
Atmospheric Discharge Pressure  
Regulation Pressure 15 psig  
Flow: 370 gpm

## INTRODUCTION

The high content of abrasive liquids flowing through the control elements of the separation stations of Activo Integral Burgos Reynosa causes a very short trim life.

Under these conditions, a suggestion was made to personnel of "Pemex Exploración y Producción" to carry out the installation of Kimray level control valves for liquids with their trim made from materials designed to resist friction of abrasive elements and also to decrease the frequency of maintenance.

To reach this objective, the proper sizing of the valves to be tested was made. Also the proper materials were selected.

| APPLICATION   | PROCESS DATA   | CALIBRATION DATA                                 |
|---|--|--|
| High Pressure Separation Tank FB-100 (Founders 1A)          | Temperature: 105 F<br>Connections 2 in 600 RF  | Supply pressure 30 psig<br>Span: 5.5 in          |
| Outlet of High Pressure Separation tank FB-100 (founders 1) | Upstream pressure: 710 psig<br>Downstream Pressure<br>Atm Opening and Closure<br>Frequency: 5 min<br>Connections: 2 in 600RF | Supply pressure: 30 psig<br>Discharge time: 23 s |

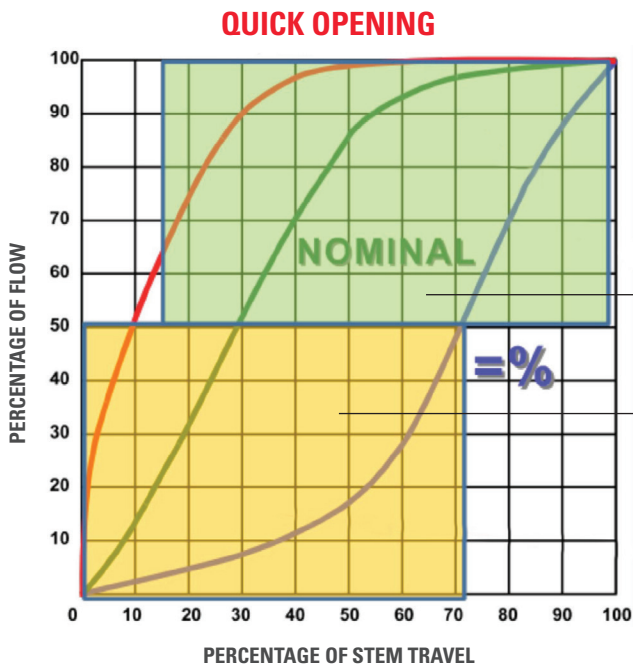
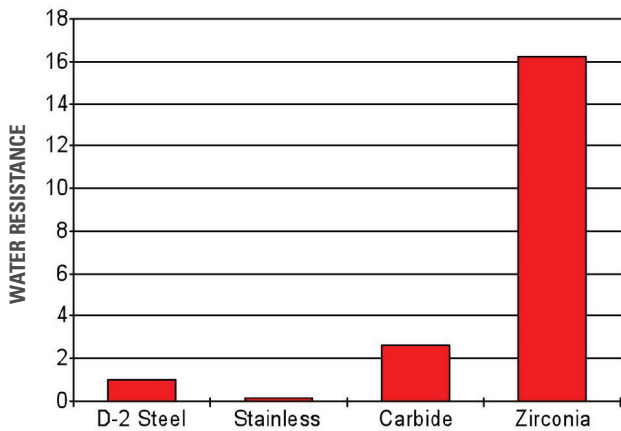
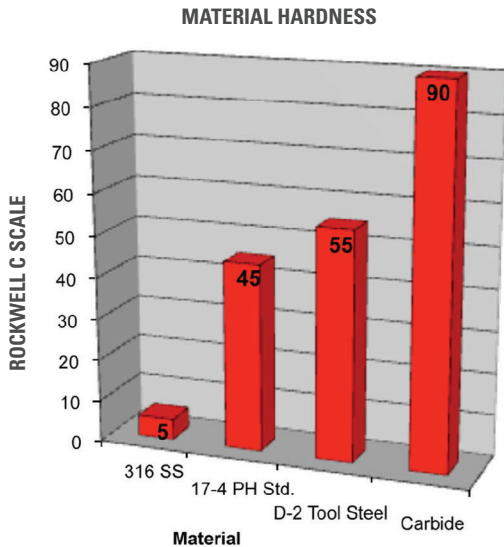
## CALCULATIONS

With the process data and using Kimsized we get the process  $C_v = 3.4$ . Ideally, a control valve must work at 50% of its capacity. For this reason, it is necessary to multiply the process  $C_v$  by 2 and to search a valve with a similar  $C_v$ . In quick opening, it is not necessary to work at 50%, so it is possible to work with a valve with a higher capacity.



# MATERIALS

The tables show the hardness of carbide compared to stainless (303, 316 and 174 PH) and standard (Steel D2) materials. Although zirconia is much harder than carbide because it is a ceramic material, carbide is protected when working at low speed zones with a quick opening seat.



|  | Cf    | Cv     |
|--|-------|--------|
| 1/4 Carbide  | 0.65  | 2.10   |
| 3/8 Carbide  | 0.76  | 4.07   |
| 1/2 Carbide  | 0.80* | 4.07*  |
| 3/4 Carbide  | 0.78* | 13.11* |
| 1 Carbide  | 0.70  | 19.90  |
| <b>SELECTION</b>   |       |        |
| 1/4 Nominal  | 0.55  | 2.96   |
| 3/8 Nominal  | 0.77  | 4.04   |
| 1/2 Nominal  | 0.78  | 7.20   |
| 3/4 Nominal  | 0.80  | 12.20  |
| 1 Nominal  | 0.77  | 21.25  |
| Cv (valve) = 3.4*2=6.8<br>Cv (valve) = 7.20<br>(the Cv nearest to 6.8)<br>Working range = 3.4/7.20 = 47%                                 |       |        |
| According to the Process Cv calculated, a High Pressure Motor Valve 2 HPMV with 1/2" or 3/4" trim and quick opening flow characteristic. |       |        |
| <b>VALVE HPMV 2"</b>   |       |        |
| Inner valve  |       |        |
| *Inner valve sizes proposed  |       |        |

## ADVANTAGES

### OBSERVED IN THE LEVEL CONTROL VALVE

Sizing the valve correctly, selecting a quick opening seat and choosing tungsten carbide extend the life of valve trim. The quick-opening flow characteristic makes possible to work in zones in lower speed zones. In short, it is possible to solve abrasion problems only by thoroughly analyzing the application and by making the proper selection of control equipment.

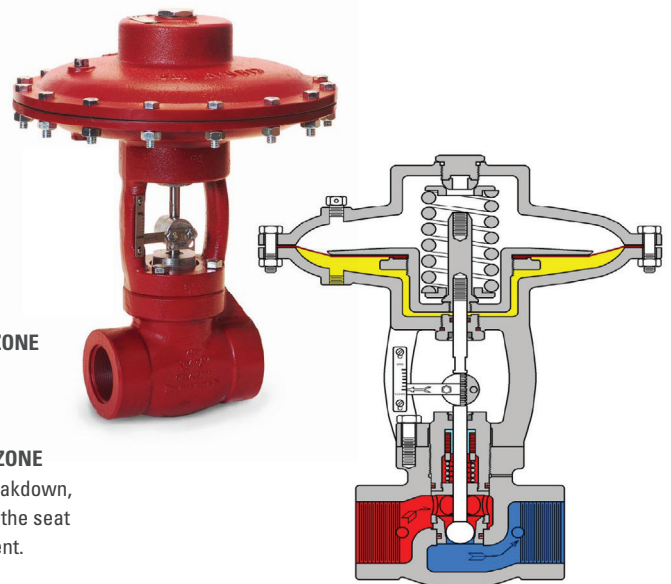
### OBSERVED BY MAINTENANCE PERSONNEL IN LEVEL CONTROLLER GEN II:

- Easy calibration
- Change of connection from right hand to left hand in the same controller
- The adjustment point is not lost

## PRODUCT

Kimray products used (part numbers / description):

E2HPMV / 2"-600 RF / 3/4" IV Carbide / Viton Elastomers



LOWER SPEED ZONE

HIGHER SPEED ZONE  
causes stem breakdown,  
serious wear on the seat  
or ball detachment.