

In The Name Of God



**A New Experience With The Native Methanol
Synthesis Catalyst Into Methanol Converter
In Shiraz Petrochemical Company (SPC)**



Outlines

1. SPC Identification
2. Methanol Plant Technology
3. Methanol converter in SPC
4. The Native Methanol Synthesis Catalyst Sarv-190
5. A Historic Review Of Methanol Synthesis Catalyst Sarv-190
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7. Bring The Converter On-line
8. The Daily Monitoring Of The Catalyst Performance Results
9. Conclusion

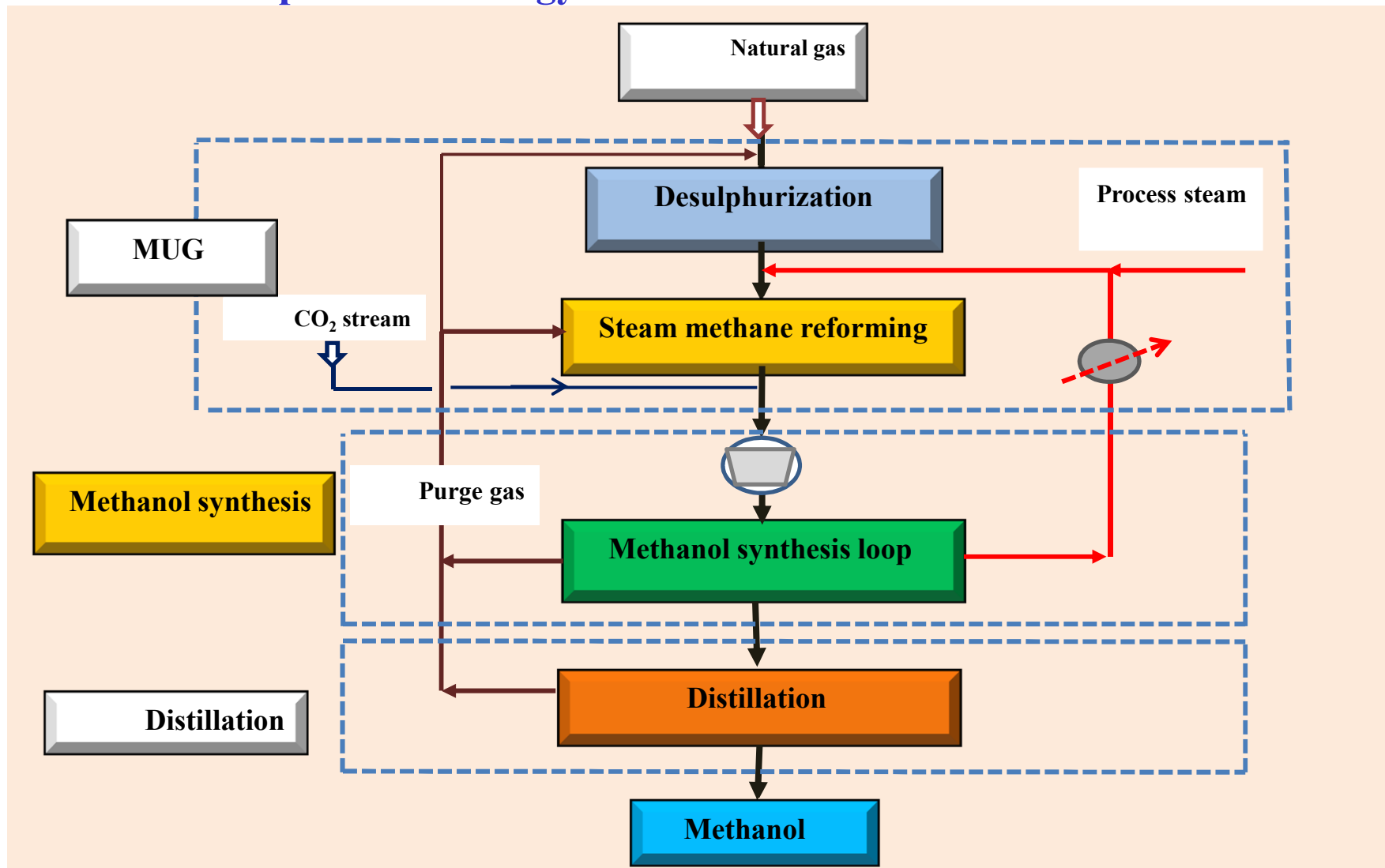


SPC Identification

- ✓ **Shiraz Petrochemical Company (SPC) Is The First Petrochemical Industry In Iran, Has Been Founded In 1342 With Ammonia, Urea And Nitric Acid Plants.**
- ✓ **The First Developing In 1364 With Establishing Of The Plants In Its Second Zone With Ammonia, Urea, Nitric Acid, Ammonia Nitrate Plants.**
- ✓ **Establishing Of The 255 MTPD Methanol Plant As The **First Methanol Plant** In Our Country In 1369.**
- ✓ **The Second Developing In 1395 With Establishing Of The 2050 MTPD Ammonia And 3250 MTPD Urea Plants In Its Third Zone.**

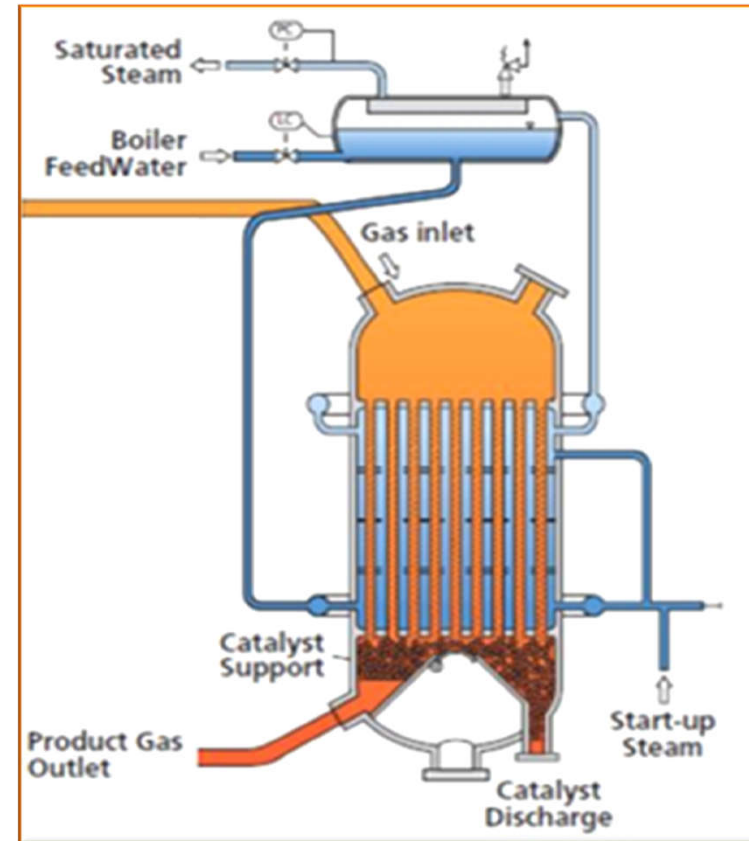


Methanol plant technology



Methanol Converter In SPC

- ❑ Lurgi Isothermal Tubular Reactor
- ❑ 2695 tubes (OD/ID: 38.1/33.9 mm)
- ❑ Catalyst volume: 17 m³
- ❑ Catalyst: Copper Catalyst On a ZnO-Al₂O₃ Support



A Historic Review Of The Native Methanol Synthesis Catalyst

Sarv-190

- Design And Formulation (1393)
- Lab-scale (1394-1395)
- Pilot-scale (1396-1397)
- Commercial-scale (1398)



Sarv-190 Catalyst Reduction

- **Heat-up Stage** Up to 160 °C (15 °C/h)
- **Initial Of Reduction Reaction** 165-170 °C
- **Controlling And Heating Rate** Up to 220 °C
- **Checking: Temperature , H₂ And CO₂ Concentration And Water**



Bring The Converter On-line

- **Build Up Pressure By Introducing Of Syngas: Up To 75 Bar**
- **Start Of Methanol Formation: 192 °C & 34 Bar**
- **Inlet And Outlet Temperature: 233 °C / 257 °C**
- **Inlet And Outlet Pressure: 78.3 Barg / 76.9 Barg**



The Daily Monitoring Of The Catalyst Performance

- **Operating Condition In SOR**
- **Pressure Drop Trend**
- **Carbon Efficiency Over The Catalyst**
- **Activity Of The Catalyst**
- **Accumulated Produced Methanol**



□ Operating Conditions Of The Catalyst

	DP (bar)	T _{in} (°C)	T _{out} (°C)	P _{in} (bar)
S.O.R	1.42	233	257	76.9
After 2 Months	1.42	234	256	77.2



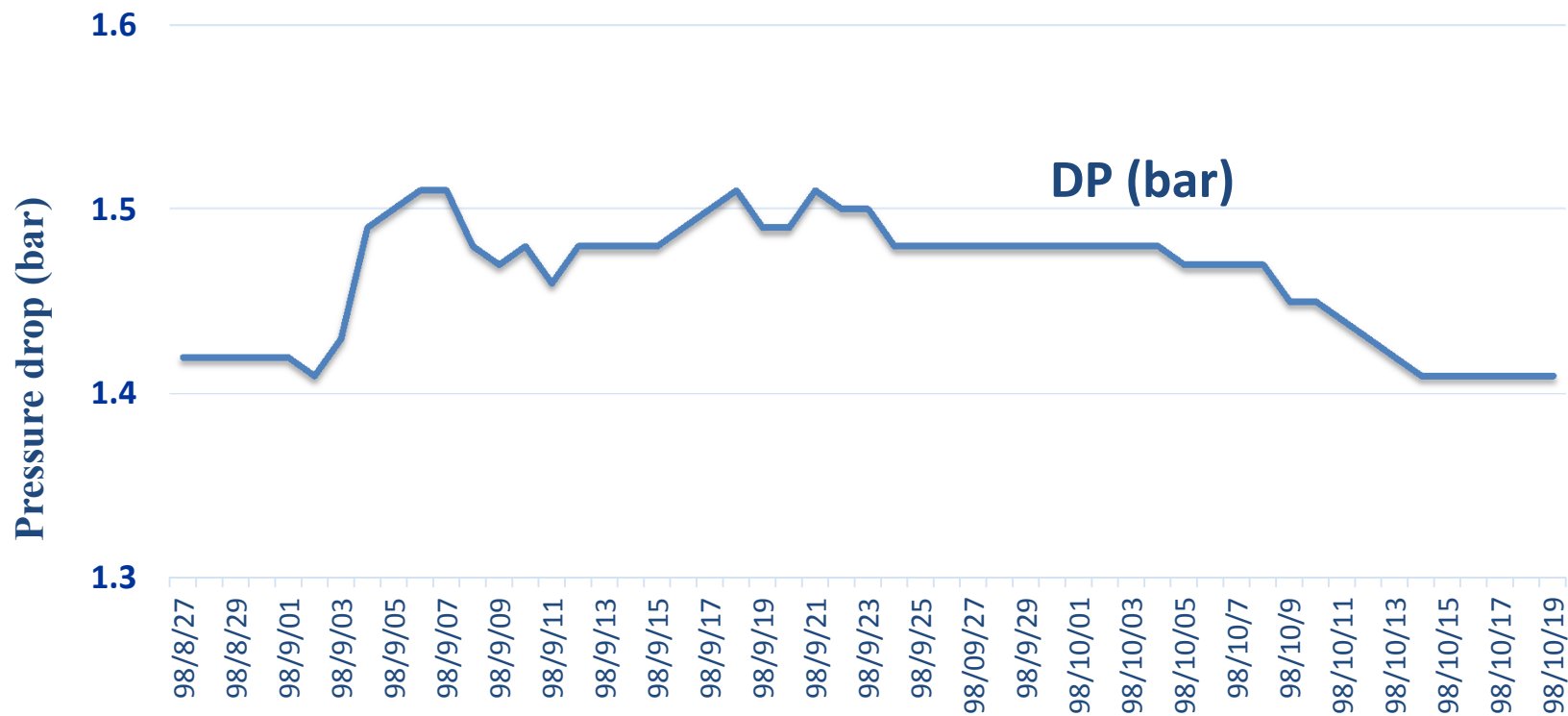
□ Gas Composition In/Out Of Methanol Converter

Inlet	CO	CO ₂	CH ₄	H ₂	N ₂
S.O.R	4.9	10	11.0	68.9	5.2
After 2 Months	5.5	8.4	11.5	69.1	5.5

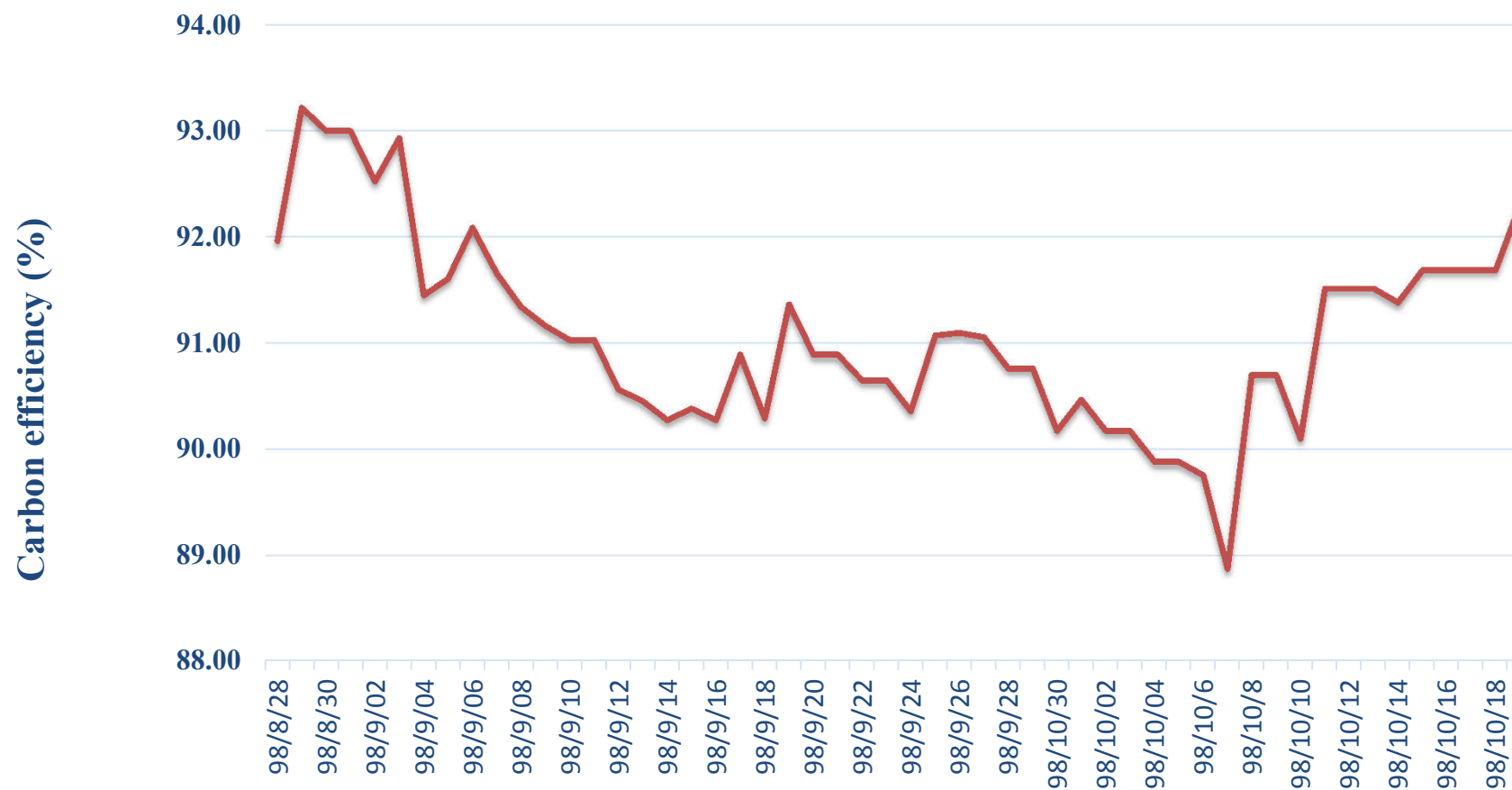
Outlet	CO	CO ₂	CH ₄	H ₂	N ₂
S.O.R	4.2	8.5	14.2	66.7	6.4
After 2 Months	3.6	7.7	13.5	68.5	6.7



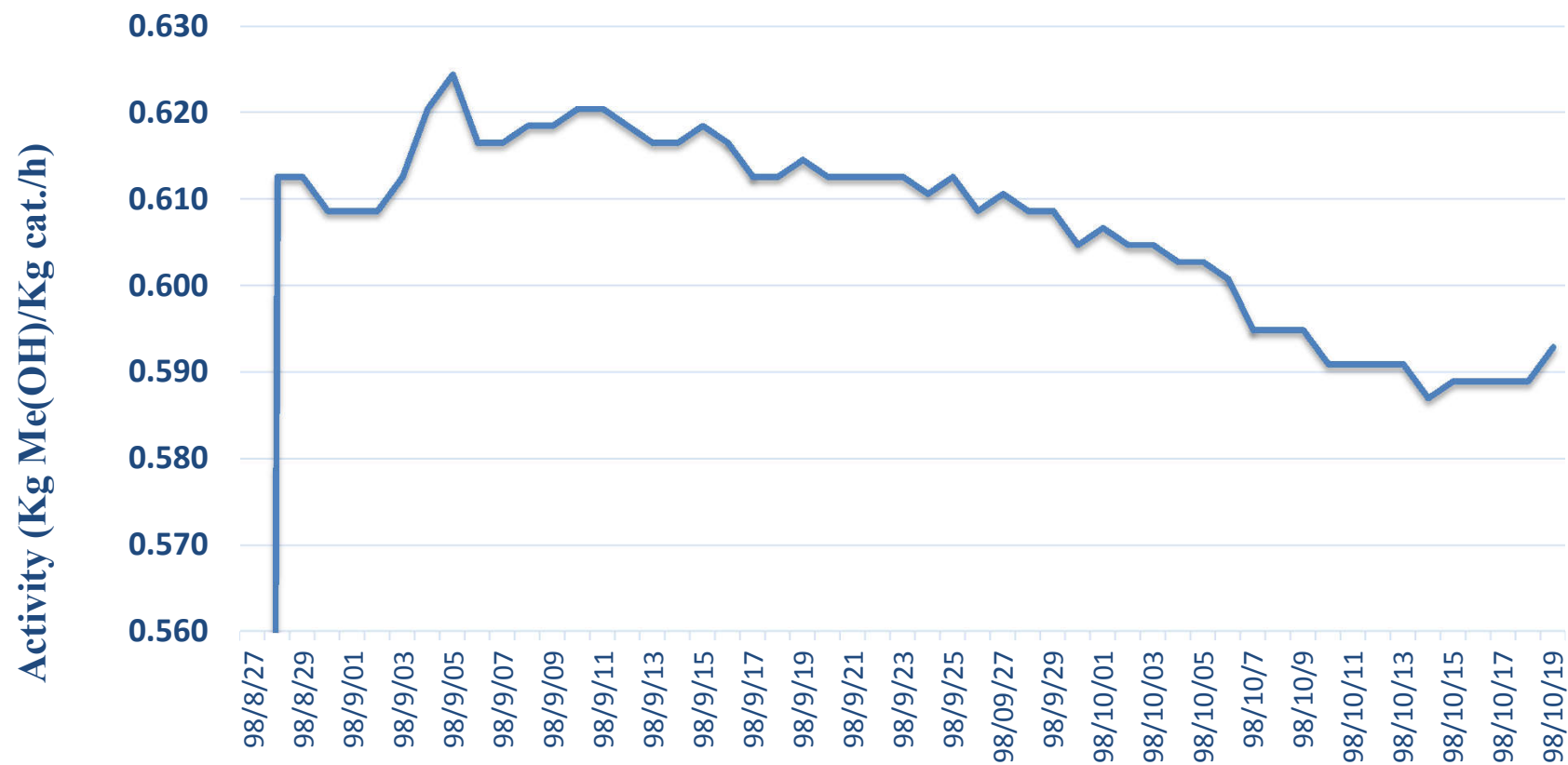
□ Pressure Drop Across The Catalyst



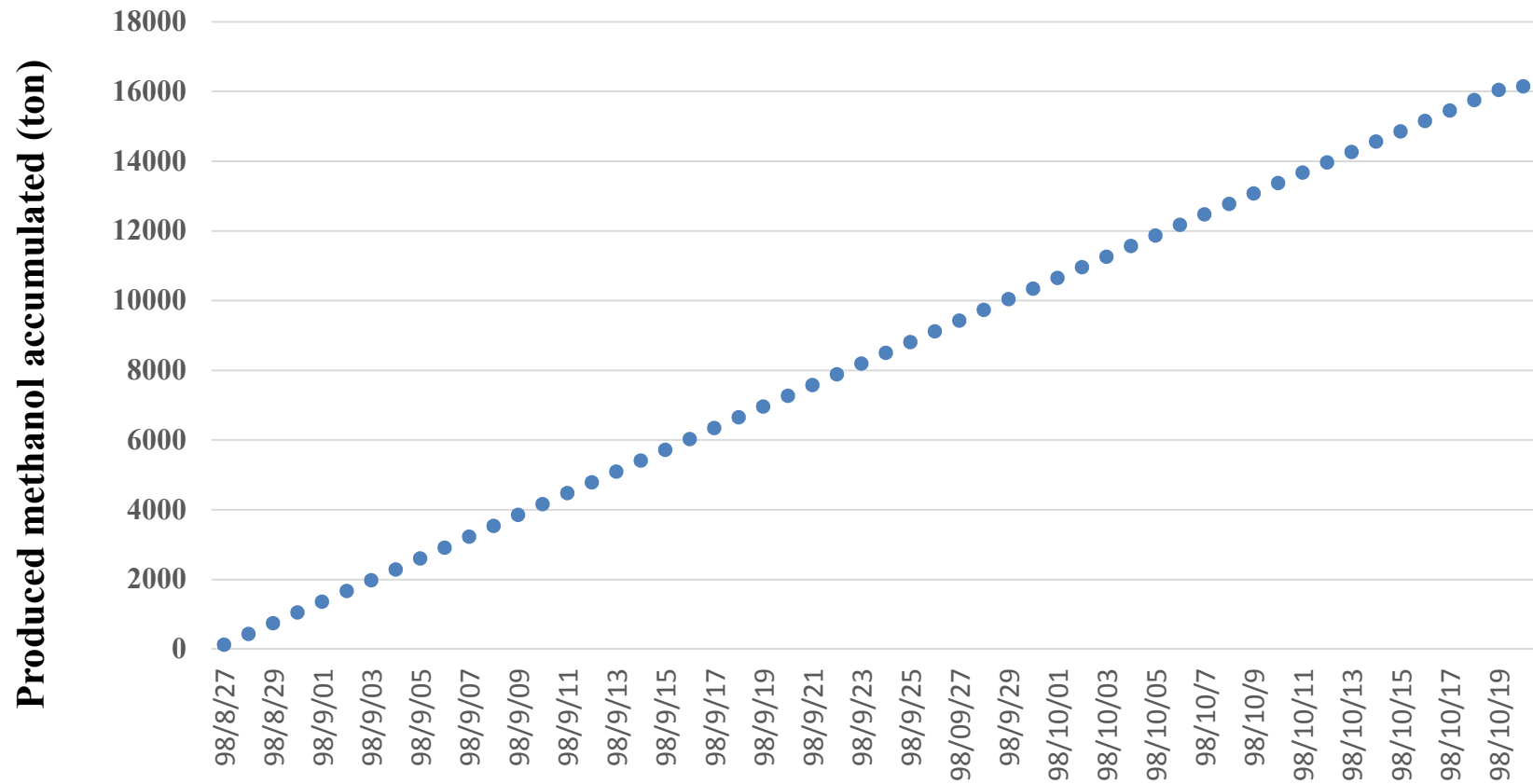
Carbon Efficiency Over The Catalyst



Activity Of The Catalyst



☐ Accumulated Methanol Production Over The Catalyst



Conclusion

- **The Sarv-190 Is The First Produced Commercial Methanol Synthesis Catalyst In Our Country.**
- **The Sarv-190 Practices The First Commercial Experience In Methanol Converter Of The SPC Methanol Plant.**
- **Requesting To Precise Of Continual Monitoring Of The Catalyst Performance From SOR To EOR, Because The Affect Of The Overall Performance On The Future Of The Sarv-190 Production**
- **In Spite Of The First Experience In Production And The First Commercial Use, The Catalyst Performance Is Good But It Needs To Continual Monitoring During Future Months.**

