

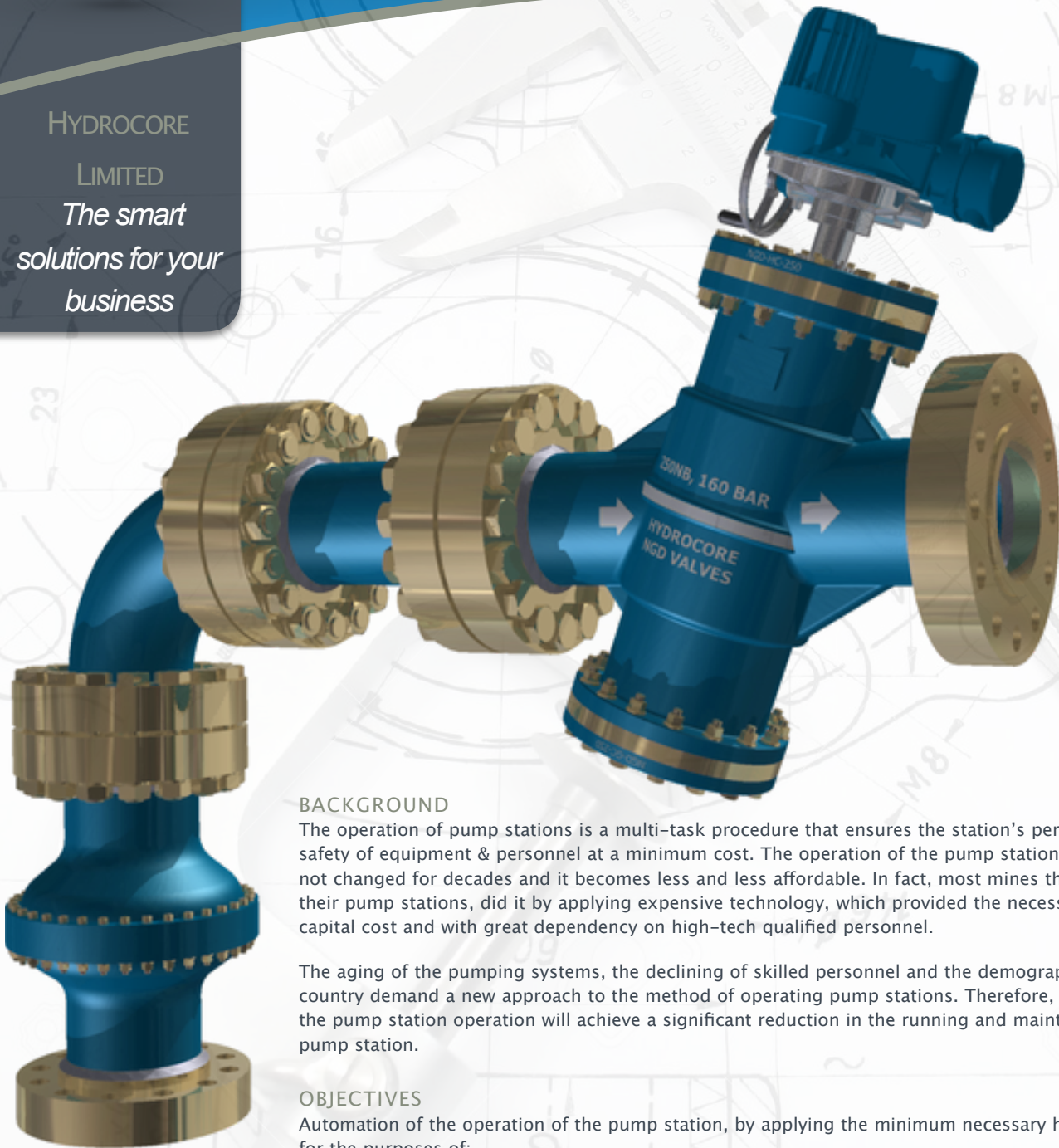


# Hydrocore™ Angular Pump Station Automation

HYDROCORE

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## BACKGROUND

The operation of pump stations is a multi-task procedure that ensures the station's performance and the safety of equipment & personnel at a minimum cost. The operation of the pump station, in some mines, has not changed for decades and it becomes less and less affordable. In fact, most mines that have automated their pump stations, did it by applying expensive technology, which provided the necessary functions at high capital cost and with great dependency on high-tech qualified personnel.

The aging of the pumping systems, the declining of skilled personnel and the demographic changes in the country demand a new approach to the method of operating pump stations. Therefore, the automation of the pump station operation will achieve a significant reduction in the running and maintenance costs of the pump station.

## OBJECTIVES

Automation of the operation of the pump station, by applying the minimum necessary high-tech equipment, for the purposes of:

- Automatic opening of the pump discharge valve, on pump startup occurrence.
- Automatic closing of the pump discharge valve, on pump stops or pump trip occurrences.
- Prevention of water hammer on pump's stopping or tripping occurrences.
- Maintaining of sufficient pump discharge pressure, regardless of the operating conditions, in order to:
  - Prevent pump's flow surge conditions.
  - Reduce wear of the pump's balancing disc.
- Reduction of the operating cost by optimizing the required manpower for the operation of the pump station, with regards to:
  - Intensive-labor operating personnel.
  - High-tech maintenance personnel.
  - Reduction in the dependency of the mine on high-tech qualified personnel mostly because this type of personnel becomes less available and less affordable.
- Reduction of the running & maintenance cost, due to the:
  - Reduction of potential damage to pumps and pipelines.
  - Reduction of the maintenance cost of pumps, instrumentation and columns.





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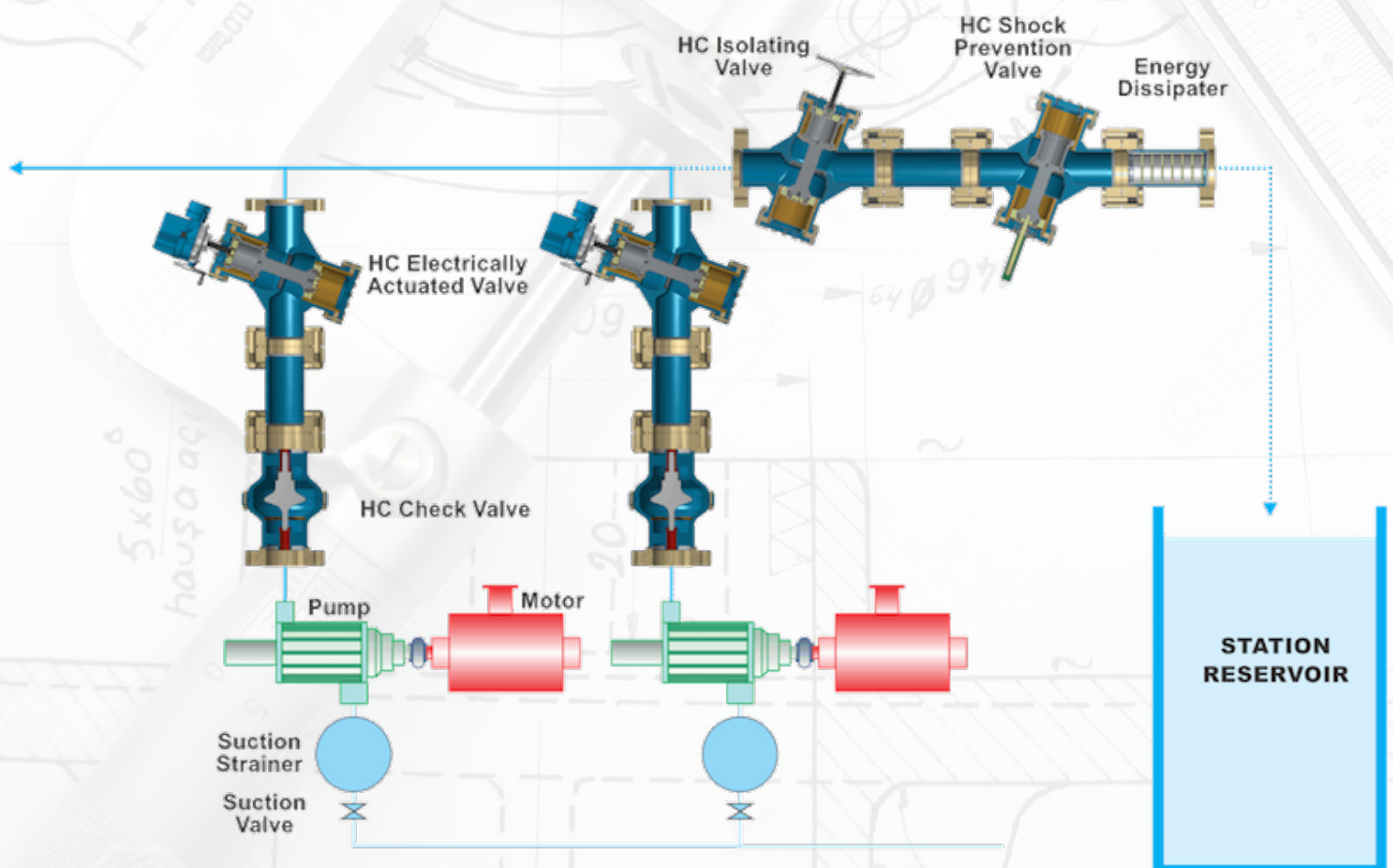
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## PRINCIPLES OF OPERATION

The Hydrocore™ Pump Discharge Control Valve is a new and innovative application of the Hydrocore™ valve series and combines three basic principles of the Hydrocore™ valve series (known previously as the NGD valve series).

The unique features of our valve are:

- Opens automatically on pump startup as a result of the pump's discharge pressure acting on valve's shuttle.
- Prevents pump surge conditions by maintaining a positive discharge pressure when the pump is running, irrespective of the discharge column fullness level.
- Closes automatically on pump stop as a result of the valve's top compartment force, acting on the valve's shuttle, against the pump's reduced discharge pressure.
- Assists Hydrocore™ check valve on the pump's discharge.
- Can prevent water hammer on pump trip or pump stop occurrences by utilizing an Hydrocore™ check valve.
- Prolongs the balancing disc life span by maintaining a positive discharge pressure when the pump is running, irrespective of the discharge column fullness level.
- The pump discharge valve can also be electrically actuated (instead of pneumatically actuated).







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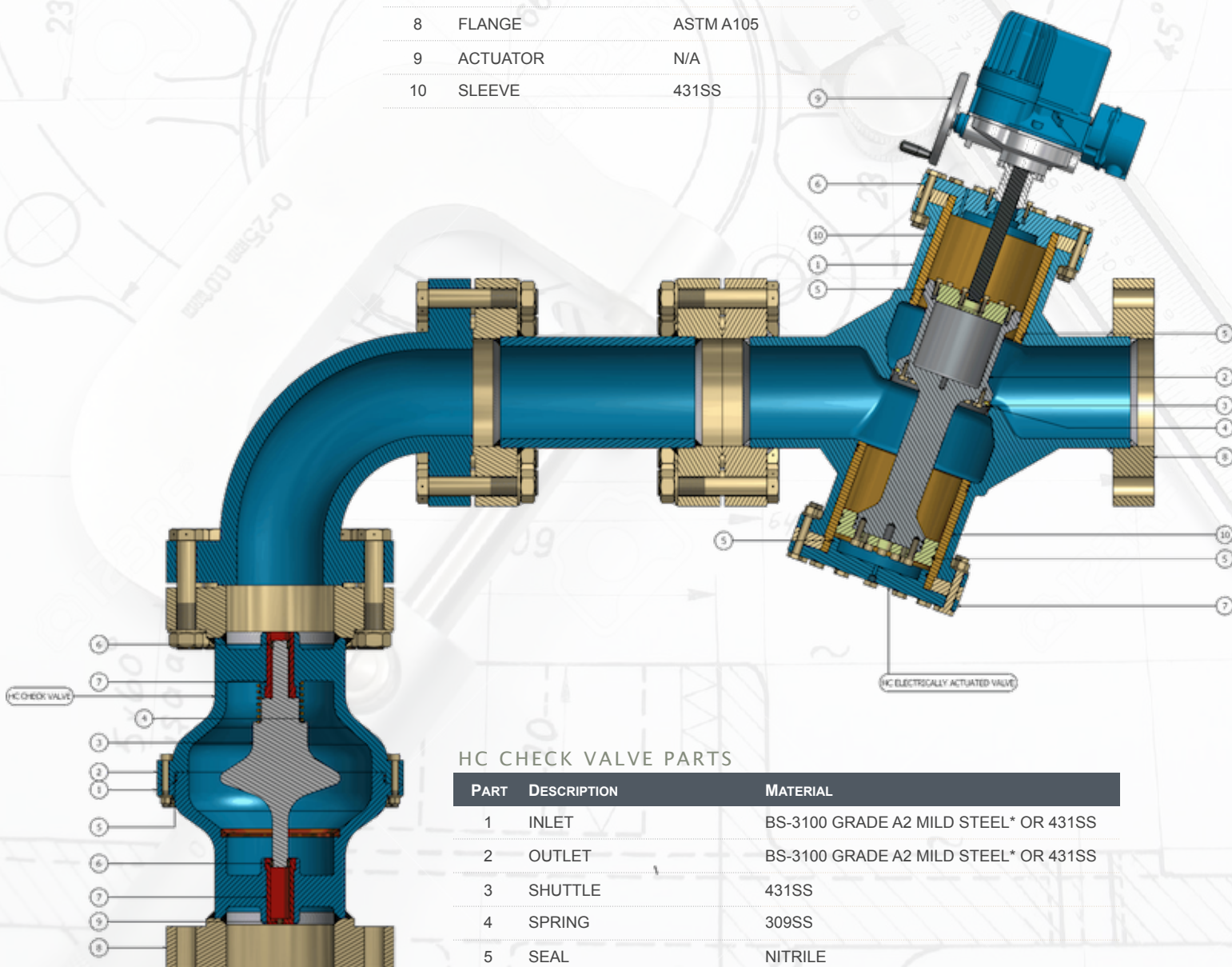
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## HC ELECTRICAL ACTUATED VALVE PARTS

PART	DESCRIPTION	MATERIAL
1	BODY CASTING	BS-3100 Grade 2
2	SHUTTLE	431SS
3	SEAT	UHMPWE
4	SEAT HOLDER	431SS
5	SEAL	NITRILE
6	TOP COVER	EN-8
7	BOTTOM COVER	EN-8
8	FLANGE	ASTM A105
9	ACTUATOR	N/A
10	SLEEVE	431SS



## HC CHECK VALVE PARTS

PART	DESCRIPTION	MATERIAL
1	INLET	BS-3100 GRADE A2 MILD STEEL* OR 431SS
2	OUTLET	BS-3100 GRADE A2 MILD STEEL* OR 431SS
3	SHUTTLE	431SS
4	SPRING	309SS
5	SEAL	NITRILE
6	SHUTTLE BUSH	Bronze
7	SLEEVE	431SS*
8	FLANGE*	ASTM-105
9	SPEED CONTROL ORIFICE	