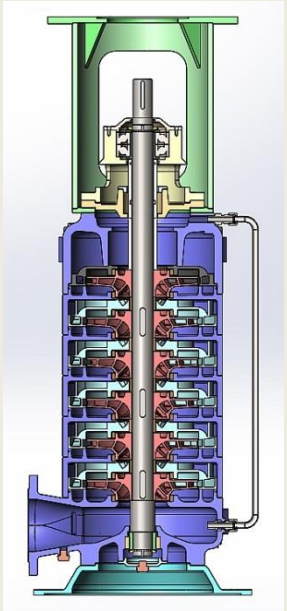
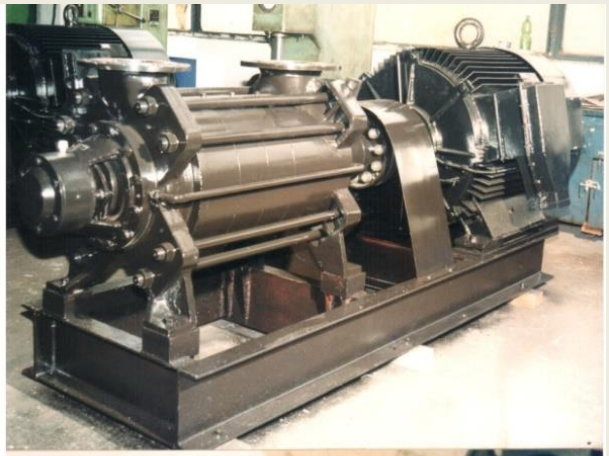
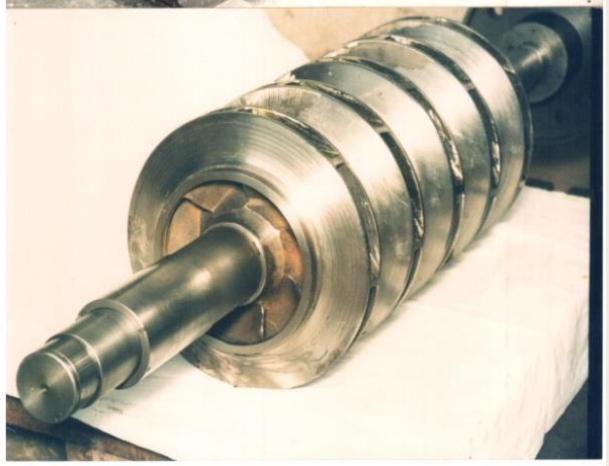
MULTISTAGE HIGH PRESSURE PUMPS

In following sectors

NUCLEAR SECTOR
OIL&GAS SECTOR
INDUSTRY
WATER SUPPLY







NUCLEAR and OIL & GAS SECTOR

APPLICATION

Oil & Gas, Water Supply, Offshore , Irrigation, Industry

Flow rate: Q = 10 – 900 m3/h

Head: H = 10 – 1000 m

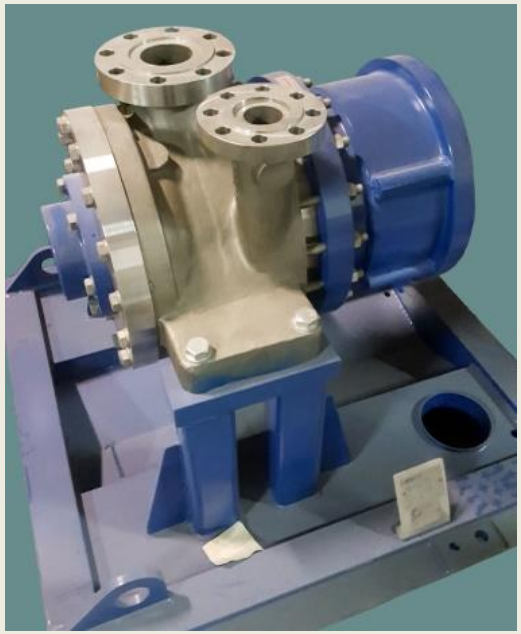
Temperature: t = 200 °C

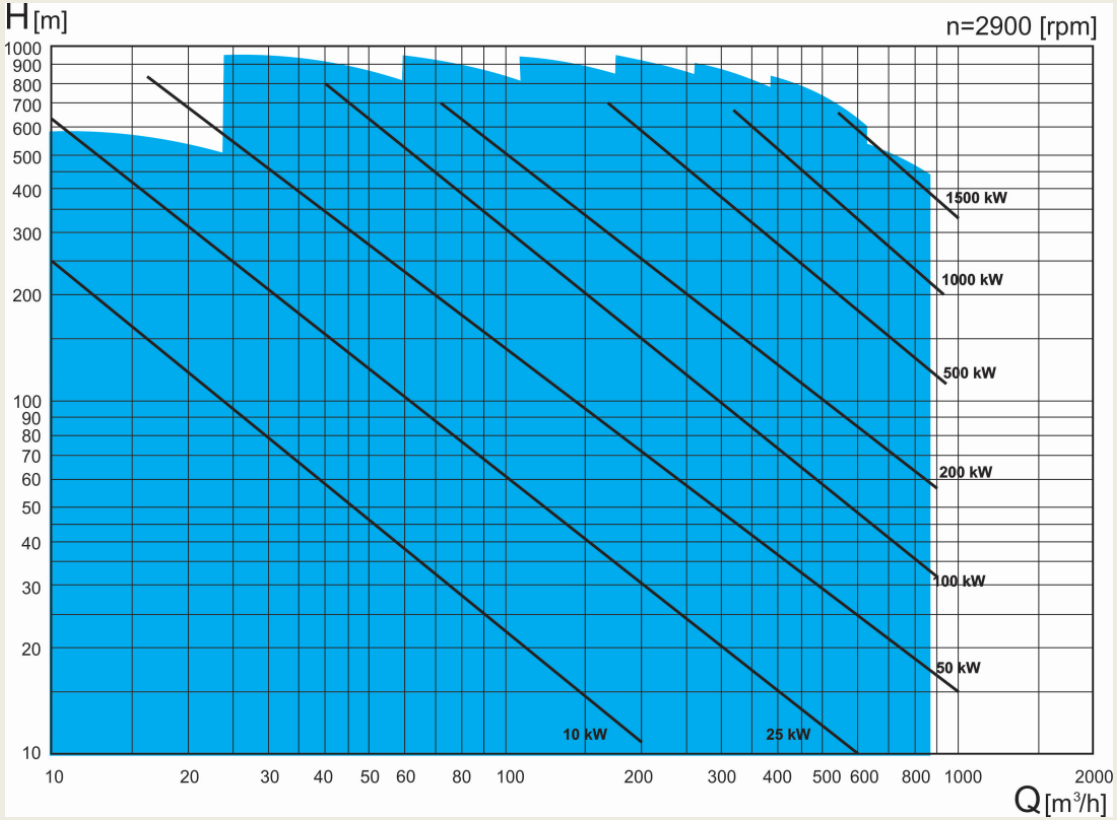
Speed max 3500 rpm

NUCLEAR DESIGN - NUCLEAR CODE

OIL&GAS DESIGN - API 610 BB2, BB4

INDUSTRIAL DESIGN - ISO 5199

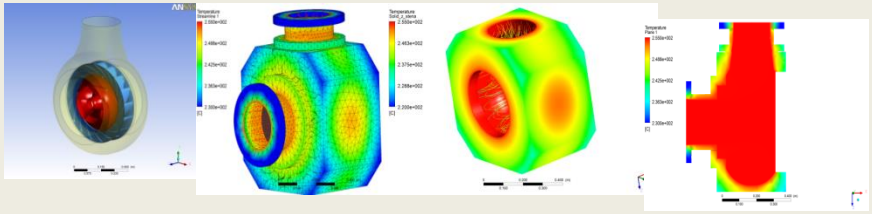




SM PUMPS - IMPORTANT REFERENCES
NUCLEAR and OIL & GAS APPLICATION

1	Nuclear reactor cooling pumps Design pressure 450 bar Design temperature 400 ^{o}C	2011 - 2017 design of 3 pump types Because of confidential agreement technical data are not available	RUTSCHI SWITZERLAND
REACTOR COOLING PUMPS ARE THE MOST RELIABLE AND MOST REPONSIBLE PUMPS IN THE INDUSTRY			

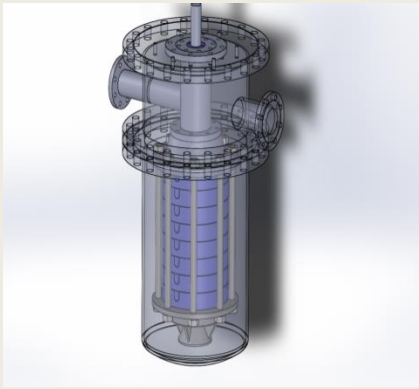
Design Nuclear Codes and Standards
International Atomic Energy Agency
National Nuclear Energy Commission
US Nuclear Regultory Commission
ASME Code, ANSI Code, ASTM Code
ANSI Code
Hydraulic Insitute Standards
Military standards
American Petroleum Institute Standards

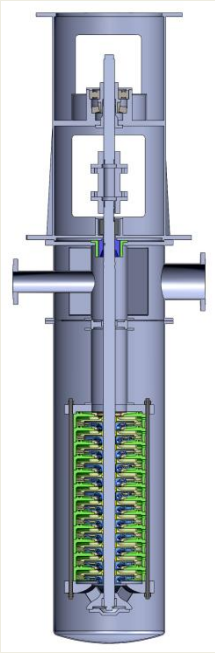


Design Criteria
Basic Hydraulic requirements and conditions for normal operation
Stress limits
Normal operating conditions
Abnormal operating conditions
Emergency conditions
Faulted operating conditions
Pressure - temperature limits
Stress, thermal and fatigue analyze
Relibility characteristcs
Failure Mode and Effects Nanalyzes
Mechanical shock
Seismic Requirements
Flow reate - vibration mode
Flow rate - stability mode
Noise and Acoustic Quieting
Hydraulic Instabilities
Rotor and Rotor Shaft characteristics

SM PUMPS - IMPORTANT REFERENCES
NUCLEAR and OIL & GAS APPLICATION

Multistage barrel pump H = 900 m	Design - Nuclear code	**Rutschi - Switzerland**
Horizontal pump SMKM Q = 480 m/h	Design - Nculear code	**Rutschi - Switzerland**
Submersivle pump Q = 48 m3/h	Design - Nculear code	**Rutschi - Switzerland**
Development of high pressure pump for electrical motor cooling system integrated in the motor nuclearcode	Hydraulic development nuclear code mechanical design	**Rutschi - Switzerland**
Horizontal multistage punp BB3 Range of 6 pumps Q up to 200 m3/h H = 2100 m	Hydraulic and mechanical development	**Hidroing Slovenia end user MoI Iran**
Horizontal multistage punp BB3 Range of 6 pumps Q up to 350 m3/h H = 2500 m	Hydraulic and mechanical development	**Hidroing Slovenia end user MoI Iran**
Horizontal multistage punp BB3 Range of 6 pumps Q up to 540 m3/h H = 2500 m	Hydraulic and mechanical development	**Hidroing Slovenia end user MoI Iran**
Horizontal multistage punp BB3 Range of 6 pumps Q up to 800 m3/h H = 2500 m	Hydraulic and mechanical development	**Hidroing Slovenia end user MoI Iran**
Horizontal multistage punp BB3 Range of 6 pumps Q up to 1250 m3/h H = 2300 m	Hydraulic and mechanical development	**Hidroing Slovenia end user MoI Iran**
Horizontal multistage punp BB3 Range of 6 pumps Q up to 1800 m3/h H = 2000 m	Hydraulic and mechanical development	**Hidroing Slovenia end user MoI Iran**
Multistage pump API 610 Q = 800 m3/h, 2000 m	Hydraulic and mechanical development	**Technica Italiana**
Multistage pumps Q max = 800 m3/h, H max =900 m	Hydraulic and mechanical design	**CRI India**
Multistage pump for Refinery services nq 18	Hydraulic and mechanical development	**Briscon - Cyprus**





High pressure multistage pumps
IMPORTANT REFERENCES