Steam Converting Valves

for medium and low pressure bypass stations

Type DUV-E20/E40

WELLAND & TUXHORN AG

ARMATUREN- UND MASCHINENFABRIK

Type **DUV-E20/E40**

Form Follows Function

Precise control for flawless operation

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Steam admission phase
1 As soon as the regulating device (regulating piston or flow restrictor) leaves its final closing position and the steam through-bores of the regulating stage are opened, a certain amount of steam passes through these bores.

Pressure reduction
2+3 The through-bores applied according to a desired characteristic curve are released by 0-100% stroke movements of the regulating device. The regulating device takes over the pressure and flow control. .

Discharge phase
4 The required amount of cooling water is injected according to the amount of steam. The cooling water is injected by means of pressure-controlled nozzles in accordance with the design principle if the E20 steam-converting valves are used at nominal outlet diameters of <= DN 1000.
The nozzles in central position are opened first, depending on the cooling water quantity. The other nozzles are opened as the cooling water quantity increases.
The nozzles in axial alignment in the steam flow ensure homogeneous temperature distribution in the exhaust pipe.

5 The cooling water is injected by means of nozzles positioned in the form of a ring in relation to the steam flow in accordance with the design principle if the E40 steam converter valve type is used at nominal outlet diameters of > DN 1000.
The designed radial alignment of the nozzles takes into account in particular the existing relatively high nominal outlet diameters and likewise ensures homogeneous temperature distribution in the steam pipe.
At modern power stations the required cooling water quantity is determined energy-balanced by means of an enthalpy regulation and fed to the nozzles via a corresponding cooling water control valve.

	Inlet	Outlet
Nominal size	DN 200 to 800 / 8” to 32”	DN 500 to 1600 / 20” to 64”
Material	WN 1.0460 / A 105 · WN 1.5415 · WN 1.7335 / A 182 F12 · WN 1.7383 / A 182 F22 WN 1.4903 / A 182 F91	
Process connection	Welding ends of all types	
Nominal pressure	PN 16 to 250* / Class 150 to 1500*	PN 16 to 100 / Class 150 to 900
Seat and plug	WN 1.4122, > 560 °C on demand	
Seat-plug-sealing	Metallic· Leakage class IV and V	
Body gasket	Combination profile sealing with graphite or silver coat	
Guide bushing	WN 1.7383 nitrated or stellite	
Stuffing box	Pure graphite	
Characteristic	20% equal percentage and 80% linear	
Pressure reduction	1-stage control by control piston in the perforated cylinder. In addition, 2nd stage control with perforated cylinder at seat	
Rangeability	> 1:30	

* Technische Änderungen vorbehalten

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High Availability

- Best cooling over the entire load range by sequential opening of the pressure controlled nozzles (E20) and conceptual consideration of larger outlet sizes by the use of radial nozzle arrangement (E40)
- Optimized spray angle and minimized droplet size, taking into account the latest research results
- Compact design due to steam reduction by control-piston or perforated cylinder
- Suitable for high temperature applications
- Available in combination with customer specified dump tube
- Inherent low-noise and low-vibration operation

Available Kvs and Cv values

Type		1	2	3	4	5	6	7
DN Inlet/Outlet		250/500	250/700	300/900	350/1000	400/1000	450/1400	500/1400
Seat-Ø	mm	210	250	300	350	400	450	500
Piston-Ø	mm	210	250	300	350	400	450	500
Stroke	mm	160	200	200	250	250	275	300
Seat cross section	cm^2	346	490	706	962	1256	1590	1963
Adjustable flow area	cm^2	300	410	590	800	1050	1350	1630
Kvs		1015	1388	1997	2710	3554	4570	5517
Cv		1188	1623	2336	3168	4158	5346	6455

Variability

Actuator selection: electric, hydraulic, pneumatic

Precise Planning

Customized installation instructions for highest reliability

A steam converting station is comprised of both the steam converting valve, and the associated cooling water control valve. The coordinated feed forward temperature design of these two components is critical to proper operation of the system.

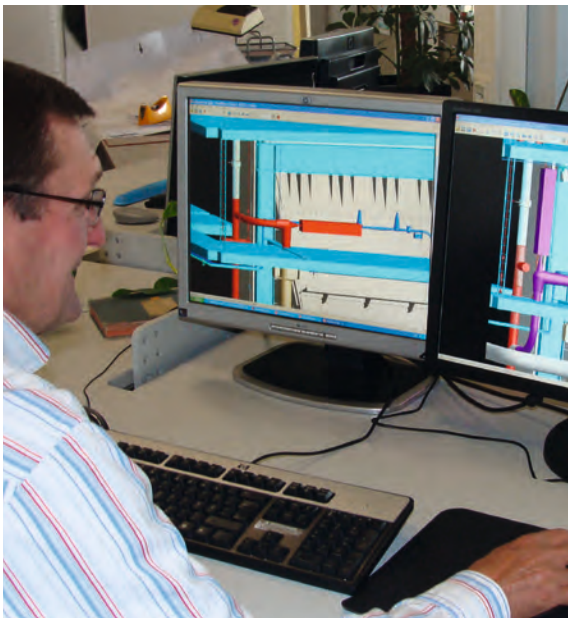
Steam piping:

No normal bends or three-dimensional bends, immediately in front of or behind the valve.

- Guide values for straight lengths of pipe work are:
  - Upstream line approx. 5 dia ., minimum approx. 2 - 5 m ace. to nominal size
  - Downstream line approx. 10 dia., minimum approx. 3 -5 m ace. to nominal size
- The upstream line should have a slope against the direction offlow of approximately 100: 1 to 200: 1. A properly sized drain should be installed at the lowest point.
- Take care to avoid the possible accumulation of condensation as damage may occur to the pipe and valve from water hammer and erosion. Warming-up and heating lines prevent the formation of condensation and reduce critical thermal stresses during start-up and shut- down. Remember that continuous operation produces little con densation, whereas frequent starting and stopping produces a great deal.
- Please follow the recommended start-up curves. Otherwise there is a risk ofthermal stress. Longitudinal expansion should be brought about slowly.
- Arrangement of steam converting valve and cooling water control valve close together; the desuperheating cooling water control valve should be placed lower than the injection point of the steam converting valve.
- Vertical spindie for easy maintenance, therefore shortened assembly time. Desuperheating water supply through symmetrically rising pipes. They ensure a continuous and constant supply of water to the injection point in the converting valve; in the case of operation shutdown, they prevent the cooling water pipes from draining. Drain line at the lowest point in the system.

Cooling water lines:

Cooling water lines have to be installed with enough flexibility to accommodate relative movement between the steam line system and the water line system. The thermo sensors have to be mounted into the straight downstream pipe, amin. of 5 - 8 m behind the valve, in horizontal exhaust steam pipes, in the 4 or 8 o'clock positions.



It is well-known that not all of these points can always be realized in practice. Shortage of available space frequently means that compromises must be made. Therefore contact our engineers in time to develop the best solution for your needs.

Dump Tubes

Low cost, optimized design

Due to the type of injection, E20 / E40 steam conversion valves are intended for use as medium and low-pressure bypass stations. The outlet of these valves, for example, is often nearby or directly in front of the condenser. Diversion und surplus production steam is to be set to the required condenser parameters on a piping section between the valve outlet and condenser which is as short as possible. The steam is led into the condenser, relieved in several stages, by means of perforated cones and cylinders.

By the use of so called “dump tubes” the investment costs for these flash trap distances are reduced:

- reduction of the pipeline length and the diameter between bypass valve and condenser.
- optimized and adjusted dimensioning of bypass valve and dump tube.
- special design of each dump tube for the corresponding application by the selection of an adjusted hole distribution. By this, damages by droplet impact erosion* at the condenser pipes are avoided.

* droplet impact erosion happens if the water drops taken with the wet steam are hitting the pipes directly with high local speed (v > 200 m/s).

Made In Germany

You will get a top product made by German valve specialists

OUR PHILOSOPHY

Control valves are inserted as a correcting element inside of a pressure, temperature, flow, or level control circuit, in power plants and industrial plants.
For these applications, a high amount of precision, workmanship and a long lifetime are required. For more than 100 years we have been gaining experience, practical and theoretical, together with renowned power station engineers and users, as well as technical and scientific institutes.
From the smallest to the biggest control valve, used in a power station, the sturdy, strong, and solid construction ensures optimal performance and operating capacity.
Our special control valves are successfully operating worldwide!

OUR QUALITY

The constantly high product quality is the result of a reasoned concept:We have implemented a multitude of quality assurance measures: Beginning with the continuous checking of drawings and manufacturing, followed by strict material inspections, surface crack detection, radiographic testing and ultrasonic testing, and ending with final pressure and tightness tests, supported by corresponding documentation.
We fulfil all regulations according to DIN, EN, VdTÜV, AD-2000, TRD and also foreign regulations and standards as ASME, ANSI, IBR and RTN.
Our quality assurance system is approved according to the following regulations: DIN EN ISO 9001: 2000, Guideline 97/23 EG (PED), KTA 1401 und ASME.
Our control valves have been tested and approved by all well-known acceptance authorities, such as TÜV, German Lloyd, Brit. Lloyd, Lloyd's Register of Shipping and Norske Veritas.

OUR SERVICE

Also, after delivery, an experienced team of service engineers will be ready to provide assistance during the start-up period, or to carry out routine inspections.
An overhauling department integrated in the manufacturing department is at your disposal. Not only do we test on further usability and overhaul professionally, we can also incorporate any new design innovations into your system.

Should you wish to know more about this, please contact us. Our engineers and technicians are looking forward with pleasure to having a detailed discussion with you

CCPP Shuweihat, UAE

TÜV CERT

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