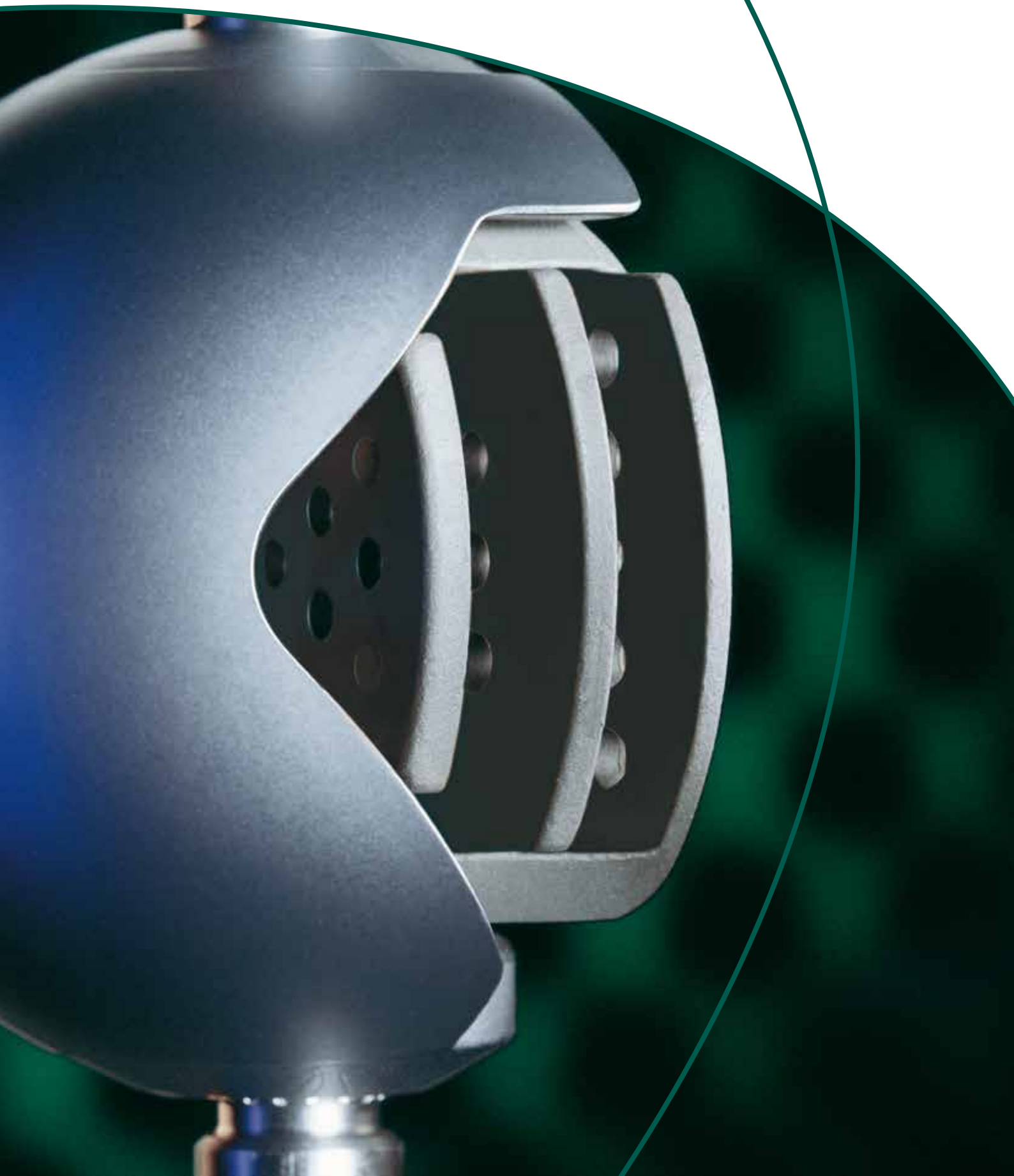
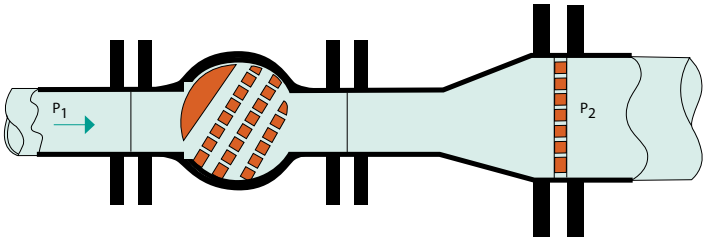
Q-Trim® rotary valves.

Performance guaranteed by experience and continuous development.

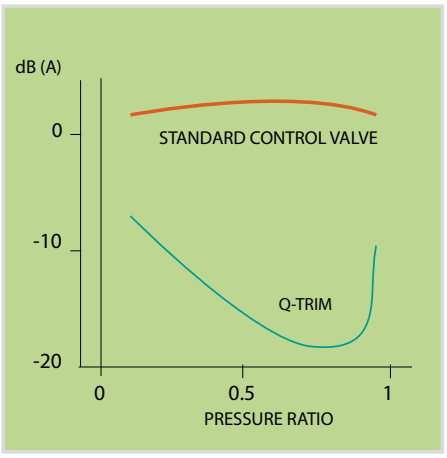
metso
Expect results



NOISE REDUCTION SOLUTION UP TO 30 dB (A) WITH
Q-TRIM AND ATTENUATOR PLATE



AERODYNAMIC NOISE REDUCTION



Neles Q-Trim: Performance beyond limits

It used to be that when noise or cavitation needed to be reduced, something else had to be compromised to gain optimum noise attenuation. Noise attenuation trims used in conventional globe valves could not pass impurities in the flow, severely limited the available valve rangeability, and increased the valve dimensions, weight and cost dramatically. For over 25 years, the rotary valve Q-Trim (Q for Quiet) design has proven optimum non-clogging noise attenuation, high capacity and rangeability, while keeping the valve dimensions, weight and cost at a reasonable level.

The Q-principle

The principle of patented Q-Trim is a combination of the following elements:

- Pressure staging
- Flow division
- Peak frequency shifting
- Self-cleaning, non-clogging

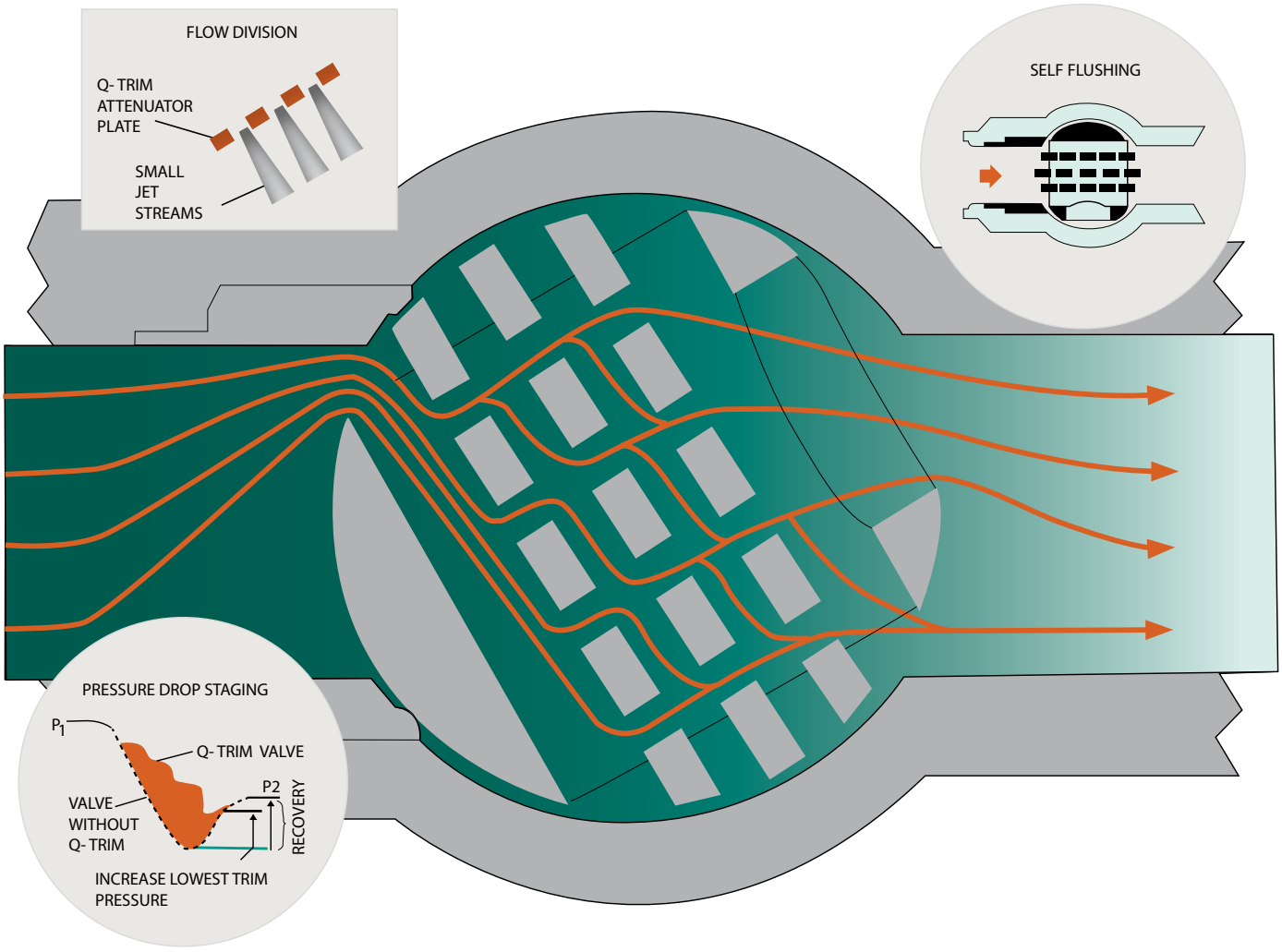
Flow is forced through the holes in perforated, successive attenuator plates. The plates create a frictional path, where each plate and the seating orifice reduce the pressure step by step. This prevents excessive velocity generation, lowers the noise level and minimizes cavitation. When the opening angle is increased, resistance decreases as the flow bypasses the plates. This gives optimal valve flow characteristics and thus high rangeability and capacity.

Noise attenuation

Excessive control valve noise level is an indication of high vibration level, which can cause health hazards and instrumentation, pipeline or control valve damage. Q-Trim valves generally attenuate noise by up to 20 dB(A) compared to standard trim valves, and vibration level by more than 90 %. Q-Trim valves are suitable for noise and cavitation abatement in gases, vapours, steam and liquids.

Solutions to 30 dB(A) noise reduction

Static resistors such as diffusors, attenuator plates, and baffles for gases and liquids are supplied by Metso for high pressure drop applications. Additional attenuator plates within the valve or external diffusors and silencers can give up to 30-dB(A) noise reduction. Combining a diffusor with the Q-Trim often reduces the valve size required for a particular application (keeping the valve exit velocities low), thus providing the most optimal combination of economy and noise attenuation.



Handling impurities

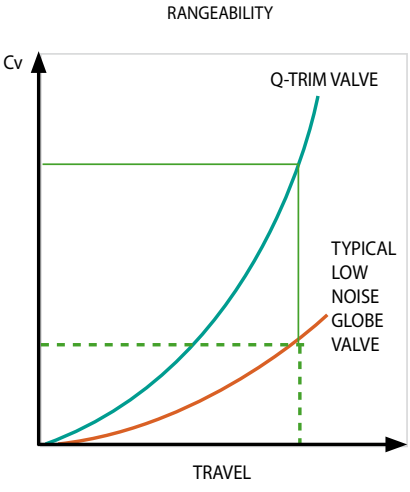
Q-Trim is the only noise/cavitation trim that can handle impurities. In globe valves, impurities in the flow stream result in clogging of noise attenuation trims. In a Q-Trim valve process media flushes buildup off the attenuator plates as the trim rotates, keeping the valve in full operating condition with dirty, viscous and even fibrous media (tested up to 3 % pulp stock). Numerous Q-Trim valves are in service handling crude oil, river water, dirty streams etc. with no performance problems or extra maintenance needed due to trim clogging.

Wide rangeability

Thanks to their opening principle, rotary valves do not encounter dynamic imbalance at small openings. Q-Trim rotary valves control successfully at very small openings and have very high capacity compared to multistage globe valves. This results in high rangeability, making Q-Trim the optimum solution for control at low flow conditions. When compared with the typical available rangeability of a globe valve, Q-Trim capability far exceeds the performance.

Eliminating cavitation

Process conditions occasionally provide pressure drops which reduce liquid pressure below vapor pressure in the valve trim. Subsequent pressure recovery at the valve outlet produces cavitation. If disregarded, severe body and pipeline damage will occur. With Q-Trim, multistage pressure drops maintain a minimum trim pressure above liquid vapor pressure, dramatically reducing or eliminating cavitation.



Responding to new demands with continuos development

As our customers strive to develop their processes to meet new demands in the marketplace, Metso takes pride in being one of the most active companies in creating new products to fulfill their future demands. Ongoing development of the Q-Trim design is yielding increasingly high performance in noise and cavitation attenuation, while preserving its unique features of superior rangeability and the capability of handling impure fluids.

Compact package

The compact rotary valve package demands less space and fewer supports. With its high capacity, the Q-Trim valve can often be one or two sizes smaller than other noise/cavitation trim valves.

Extended valve lifetime

High valve trim velocity can cause damaging noise level and dramatically increase valve erosion. With the lowered flow velocity obtained with Q-Trim, valve erosion is significantly reduced. In liquids and gases containing particles, the difference in performance becomes even greater. There is evidence where Q-trim has extended valve lifetime up to 5 times that of a conventional valve.

Meeting today's safety and environmental requirements

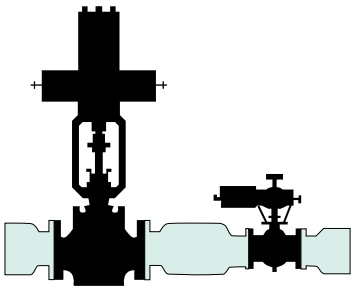
Our live-loaded low emission packing is available for all valves equipped with Q-Trim. These valves offer full conformity with the strictest environmental regulations. Q-Trim valves are also available fire-tested to API 607 and BS 6755. This feature, rarely available in modulating control valves, has gained the attention of the world's most advanced hydrocarbon processing companies.

Typical applications

Compressor surge control/recycle valve

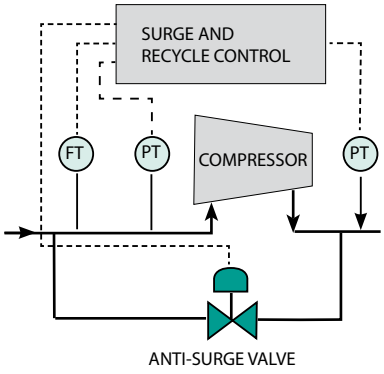
The compressor surge control or recycle valve forms a critical link between the discharge and suction sides of the compressor. With their high rangeability and capacity, Q-Trim valves are admirably suited for this demanding application – and offer greatly reduced noise and vibration levels. The rotary design inherent in the Q-Ball valve makes it faster than conventional designs, while allowing minimal restriction to full flow. The simple and rugged design easily withstands the repeated stress of rapid recycling.

COMPACT PACKAGE



Pump discharge and loading arm applications

To minimise energy losses, pump discharge and loading arm applications require maximum rangeability and high capacity, both characteristics of Q-Trim valves. The non-clogging feature of Q-Trim is important when loading heavy fuel oils and crude oils. Experience also shows that severe cavitation and vibration may occur at the loading arms when standard control valves are used, particularly with high vapour pressure products like naphtha, jet fuel and crude oil. The variable flow resistance of Q-Trim valves eliminates the vibration and cavitation problem.



New solutions

Q-Trim has been used for many years in our ball, segment and Finetrol rotary eccentric plug valves. This has extended the application range of rotary valves in severe services where normally only multistage globe valves are utilized. Q-Trim technology is a standard option for all Metso rotary valves, and is now available in the new Neles RotaryGlobe control valve.

Cooling tower make-up water

Cooling tower make-up valves control the amount of river or lake water flowing into the cooling tower basin to compensate for water lost through evaporation. There are two problems inherent in this application. The high pressure drop can cause severe cavitation, destroying both downstream piping and the valve itself. Cooling tower make-up water is also coarsely screened; mud, sand, small rocks and other impurities are contained in the flowing water.
A trunnion-mounted Q-Ball valve has proved to be the best solution here. The valve can handle severe pressure drops, because it eliminates the pressure peaks causing noise, cavitation and erosion. Unlike conventional cavitation trims, Q-Trim can also be rotated so that the flow itself flushes the plates clean.

Gas blowdown

Gas blowdown control valves, such as gas-to-flare, are in the closed position 99 % of the time. All leakage in these conditions means loss of valuable gas and even incipient leakage may erode the valve seat. When the unit is depressurised, high flow capacity and high energy release at the valve regularly results in a high noise level and vibration. With the use of a Q-Trim valve, both noise and vibration are eliminated. Also, Metso seat sealing technology maintains long term tightness.

Steam control

Almost without exception, conventional control valves used for steam control produce high noise levels of over 90-dB (A). The Metso Q-Trim technology brings the noise down to the levels set by authorities.

Feed water applications

Feed water regulator valves control the water level in the steam drum. This critical application is commonly found in many types of plant. The biggest challenges for feed water valves are experienced during commissioning and start-up phase where there is commonly a high-pressure difference over the valve. This can lead to heavy cavitation in the valve. High rangeability, resistance to cavitation and self-cleaning design make an optimal solution for feed water applications up to pressure class ASME 600.

Multiphase,dirty services

Multiphase streams containing impurities such as oil sand and crude oil applications are handled with rotary valves equipped with Q-Trim. Conventional multi-stage rising stem valves tend to clog easily in such services. Q-Trim provides high capacity combined with cavitation resistance and noise reduction, in a manner no sliding stem valve can match. Q-Trim technology is developed to control flow in applications from 1" up to 36" size.

Q-Trim solutions

Q-Trim is utilised today in thousands of applications throughout the world. Various constructions of Q-Trim are available for the Finetrol eccentric plug valves, R series segment valves and Top 5 and D series ball valves. A corresponding design, the S-Disc, has been designed for Neldisc butterfly valves and the balanced trim design for Neles RotaryGlobe control valves.

T5 top entry rotary valves with Q-Trim are the best choice for gas-to-flare steam blow-off, compressor anti-surge and other duties, where exceptional, long-lasting tightness and widest possible flow range are required.

Finetrol valves with Q-Trim are general duty, economical Q-Trim valves for liquids and vapors in refineries, petrochemical plants, power plants and steam/condensate systems in any industry.

D Series split body valves offer the highest capacity Q-Trim alternative, and are therefore often used in natural gas pressure reduction, liquid pipelines, loading arms, etc.

S-Disc eccentric disc valves with attenuating and dynamic force balancing trim element provide moderate noise attenuation in large diameter/moderate pressure drop applications.

Thousands of R series valves equipped with Q-Trim have been installed since 1986. They are most commonly found in liquid applications involving fluids containing impurities, having a high viscosity or with a high fiber content.

Neles RotaryGlobe with balanced trim is the newest addition to the Q-trim offering. Applications are mainly in liquids, gas and vapors in refineries, petrochemical and chemical plants as well as with alternative fuels.

Customers using Q-Trim valves: Shell, Exxon Mobil, British Petroleum, TOTAL, PVDSA, Statoil, Dow, Neste Oil.

Europe
Vanha Porvoontie 229, P.O.Box 304
FI-01301 VANTAA
Finland
Tel. +358 20 483 150, fax +358 20 483 151

North America
44 Bowditch Drive, P.O.Box 8044
Shrewsbury, MA 01545
USA
Tel. +1 508 852 0200, fax +1 508 852 8172

South America
Av. Independência, 2500- Iporanga
18087-101, Sorocaba-São Paulo
Brazil
Tel. +55 15 2102 9700, fax +55 15 2102 9748/49

Asia Pacific
Haw Par Centre #06-01
180 Clemenceau Avenue
Singapore 239922
Tel: +65 6511 1011, Fax: +65 6250 0830

China
19/F, the Exchange Beijing, No. 118
Jianguo Lu Yi, Chaoyang Dist
100022 Beijing
China
Tel. +86-10-6566-6600, fax +86-10-6566-2575

Middle East
Roundabout 8
Unit AB-07, P.O.Box 17175
Jebel Ali Freezone, Dubai
United Arab Emirates
Tel. +971 4 883 6974, fax +971 4 883 6836

For further information please contact
one of our regional offices, or visit our
web site **www.metso.com/valves**

Metso Automation Inc., Vanha Porvoontie 229, P.O.Box 304, FI-01301 VANTAA, Finland, tel. +358 20 483 150, fax + 358 20 483 151
www.metso.com/valves