

# Variable Nozzle Desuperheater for Attemperator Application



## Attemperator

Precise temperature control at the turbine inlet

## Introduction

The objective of high pressure boilers is to produce power in addition to steam generation, for utilities. Hence the steam turbine needs to be used 100% efficiently, which is possible only if the temperature of steam is controlled precisely at its inlet.

## Where the VND is Installed

It is installed between convection and radiant super heaters (i.e. primary and secondary superheaters), its location being the attemperator.

Apart from controlling the temperature at the turbine inlet, this unit takes care of the secondary superheater T 22 / T 91 grade coils that may be affected due to temperature spikes created because of the non-linear firing properties of fuel as well. The cooling water injection characteristics can be designed as either linear or equal percentage depending upon the turndown requirements considering all eventualities.

## Specialties of the Forbes Marshall VSD

With an in depth understanding of both steam engineering and control instrumentation, Forbes Marshall is uniquely positioned to understand injection requirements coupled with the timings required. A rock steady temperature control at the turbine inlet helps achieve maximum efficiency.

Cooling water injection patterns are well developed to avoid any water hammering and in the flow profile of steam itself.

The equal percentage injection characteristics address any emergency by injecting water in multiple quantities in a fraction of time and that protects the superheater coils.

## Example

Most sugar producing units, CDR / CDM projects, WHRB, captive power units and thermal power stations, refineries and fertilizer plants:

Spectrum Power

Nagarjuna Fertilizers & Chemicals

Iffco – Aonla / Fulpur

Bajaj Hindustan

Renuka Sugars

NTPC

IOCL, Panipat

MRPL

Presently more than 1000 VND units are in operation worldwide.

## Customer Benefits

Single window approach by Forbes Marshall, right from a simple desuperheater up to an attemperator involving complex cooling water injection characteristics.

Very useful for very high turndown requirements

Separate water control valve not required

Efficient atomization

Simple installation

## Other Applications Where the VND can be Used

Turbine bypass, turbine exhaust, turbine bleed steam, auxillary steam, process steam, attemperator, pressure reducing valve outlet steam, boiler superheaters, boiler re-heaters.



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