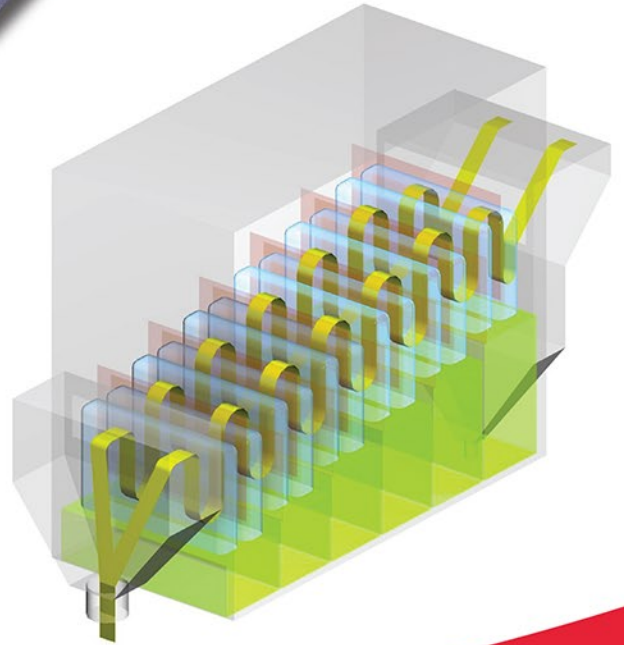
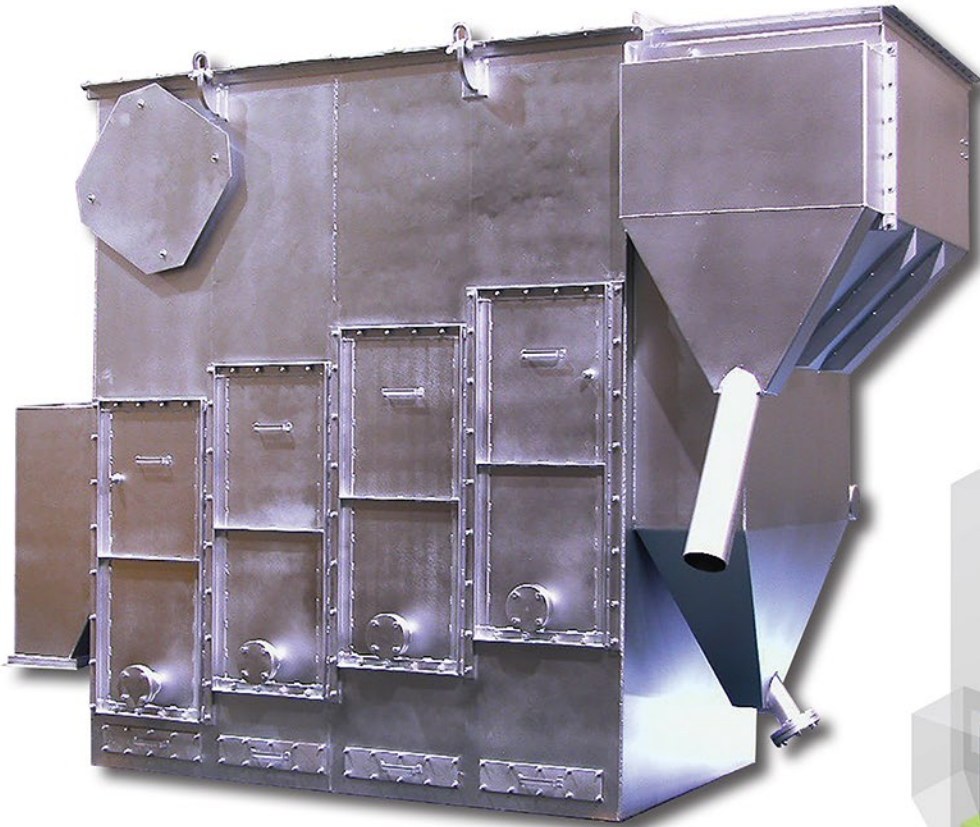


*Sand System Equipment*  
**MD COOLERS**



MD Cooler provides heat transfer from sand to circulated water via heavy-duty finned tubes. Maximum sand cooling utilizing minimum floor space.

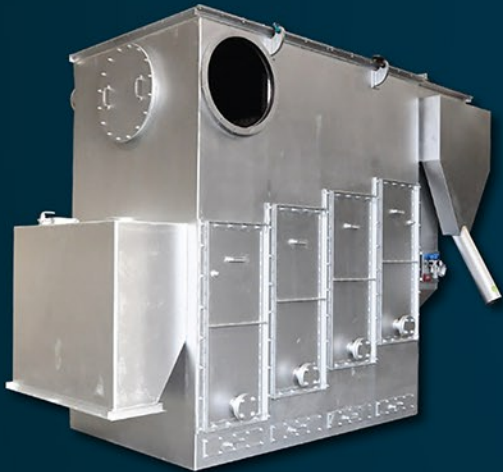
# MD Coolers

## Sand System Equipment

Vulcan's MD Cooler will cool grain-size sand after primary metal removal and screening. The non-linear path of sand and multi-stage weir layout ensures efficient heat transfer from sand to circulated water via heavy-duty finned tubes. A plenum-plate fluidization method maintains a constantly flowing bed of sand, thus providing ample retention time for cooling as well as protecting the finned tubes from the abrasive characteristics of sand. MD Coolers utilize evaporative cooled process water to cool the sand from 204°C to within 11°C (20°F) of local wet bulb conditions.

### Advantages:

- Finned tube heat transfer elements greatly increase the heat transfer surface area thus reducing the size of the fluidized bed which requires less fluidization air and consequently reduces power consumption.
- Large tube diameter and wall thickness (1-1/2" Schedule 40) greatly increases strength and resistance to sand abrasion. Fins are continuously welded to tube surface and serve to further protect tubes from sand abrasion.
- In-house fabrication and assembly of all sand cooler components allow for tight quality control over important processes like cooling element welding and leak testing.
- In-house fluidized bed pilot scale testing facility including an operational thermal sand reclaimer with integrated Vulcan Engineering Co. MD type sand cooler and equipment for evaluating sand fluidization characteristics.
- Cooling elements are installed perpendicular to sand flow. Thermal expansion of cooling elements is accommodated by allowing entire cooling element to expand into non-fluidized sand area inside cooler.
- Finned tubes are assembled into cooling element by welding at both ends. There are no o-rings subject to damage from high sand inlet temperatures. The gasket at each end of each cooling element is not exposed to actively fluidized hot sand.
- Plenum plate fluidization design requires less air volume than other fluidizer designs, and is less prone to sand wear.
- Easy-open inspection doors allow unobstructed view of sand cooler interior for initial adjustment and periodic inspection.

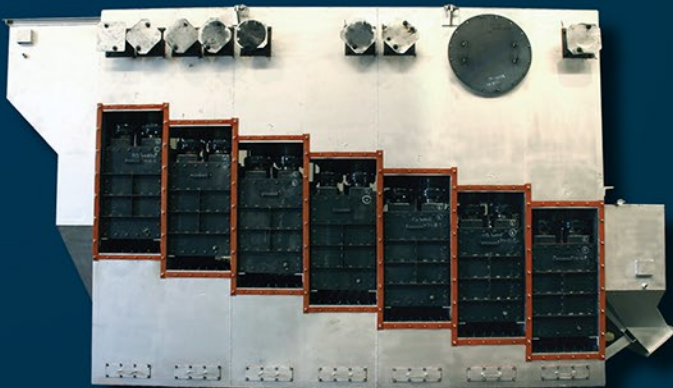


### Features

- **Multiple cooling tubes arranged in a contra-flow path to the sand**
- **Easily removable side panels for inspection/maintenance purposes**
- **Indirect sand-to-water contact prevents fouling of cooling tubes**
- **Individual cooling bundles for ease of maintenance**
- **Integral vibratory inlet screen for protection from nonmetallic debris**
- **Inlet and exit discharge hoppers included**
- **Fluidization blower is provided**
- **Dust collection connection port is provided**



- Each cooling element has a dry removal weight of 1,300 lb and is 62 inches long by 24 inches wide and tall. Cooling elements are removed from the cooler assembly for inspection and maintenance by:
  - Draining sand from the required section by opening the respective sand drainage valve
  - Entering cooler from above through provided access hatch to unbolt two pipe flanges per cooling element to be removed
  - Removing side access door for the respective section of the cooler
  - Sliding the cooling element desired horizontally out of the cooler assembly
- The tortuous path of the sand and the multiple-stage weir layout ensures consistent heat transfer from the sand to the water-cooled cooling elements.
- Depth and breadth of engineering expertise in fluidized bed applications for the foundry industry:
  - More than 70 thermal sand reclaimers installed, each with a Vulcan Engineering Co. MD type sand cooler performing final sand cooling before return of reclaimed sand to the casting process.
  - Recent similar stand-alone (not integrated with a thermal sand reclaimer) sand cooler projects include:
    - 20 tons per hour for mechanically reclaimed no-bake sand installed and operating
    - 25 tons per hour for an overseas lost foam pilot production facility installed and operating
    - 30 tons per hour for a captive automotive modified-Cosworth process casting facility installed and operating
    - 40 tons per hour for a lost foam synthetic mullite facility under-contract and being manufactured presently



<b>Model</b>	<b>Capacity</b>	<b>Dimensions</b>
454	46 TPH (42 MTPH)	1829 W x 3251 T x 4401 mm L (6 ft – 0 in x 10 ft – 8 in x 14 ft – 5.25 in)
554	54 TPH (60 MTPH)	1829 W x 3251 T x 5099 mm L (6 ft – 0 in x 10 ft – 8 in x 16 ft – 8.75 in)
654	64 TPH (70 MTPH)	1829 W x 3397 T x 5763 mm L (6 ft – 0 in x 11 ft – 1.75 in x 18 ft – 10.88 in)
754	82 TPH (74 MTPH)	1829 W x 3775 T x 6340 mm L (6 ft – 0 in x 12 ft – 4.63 in x 20 ft – 9.63 in)

*Nominal capacities based on 400° F inlet sand*

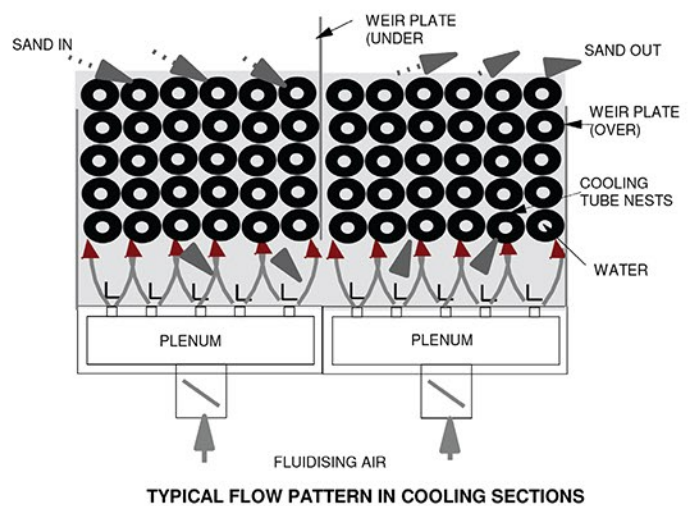
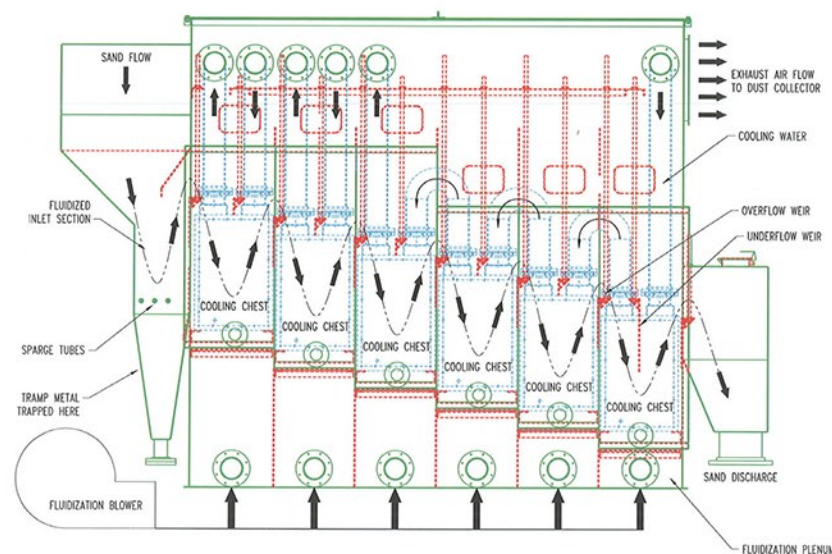
\* Features and options subject to change without notice. Dimensions depending on system.

# MD COOLERS

The cooling section is fluidized by a plenum system controlled by an external butterfly valve and consists of an air chamber with a series of holes in the upper plate by which the fluidizing air is distributed through holes spaced and sized to give balanced fluidization. Above the plate are structural angle carbon steel profiles positioned and spaced such that when the cooler is not in operation sand cannot flow back into the plenum chamber.

The cooling section is sized in several cooling chests fabricated from large bore steel tubes having spiral wound fins to increase the surface area, these are mounted over the fluidizing plenum and can be removed via the hood of the cooler or the side cover plates, however with good water quality and proper winterization, internal tube scaling can be almost be eliminated, reducing tube chest removal frequency. The finned tube cooling chests can also be inspected by removal of the side covers followed by the chest end covers.

The hot sand is made to flow in a specific tortuous path around these tubes, by a combination of over & underpasses, (which ensures that sand cannot channel and stratify in hot and cool layers. i.e. the fluidization itself will not homogenize the sand).



**Scan the Code**

Use your smart phone and scan this QR code to get more info on Vulcan's sand systems and equipment.



## Additional Equipment

Vulcan Engineering can design and build complete sand systems as well as provide upgrades and additions to existing facilities. Customized equipment and engineering services are available to make your system more efficient and profitable.

### Sand System Equipment

- Sand Coolers
- Sand Dryers
- Sand Screens
- Aerators
- Sand Transfer and Conveying Equipment
- Sand Storage and Unload Area
- Screen Sand Belt
- Prepared Sand Hoppers
- Prepared Sand Belt
- Sand Bins
- Bucket Elevators



For more information, images and videos on all of our equipment and capabilities visit our website.

<http://www.vulcangroup.com>