Descaling of Oxides for efficient Heat Transfer to achieve Optimum Cooling efficiency in neoplast® Cooler Mixers.

Descaling is the process of removing scale from cooler mixer jacket. It involves the removal of thick layers of oxides formed inside water circulation jacket at elevated temperatures. Descaling is needed when a cooler vessel jacket accumulates a significant thickness of deposits on its surface, enough to insulate the water from the heat source (Dry Blend) & impair cooling performance. Scaling is problematic because it forms on the inside surface of mixer vessel jacket and reduces the cross-sectional area available to carry water or liquids. When Water scale develops inside Vessel Heat Transfer Jacket, Cooling efficiency is greatly affected, reducing overall efficiency of the mixer, increasing energy consumption ultimately increasing the operating cost.

All too often, descaling process is ignored in favour of reducing operational downtime & saving money, resulting in efforts to fix the cooling problem at the last minute or only at the mechanical failure occurs. Descaling safely and effectively removes: Lime scale, Calcium, Rust, Water scale build-ups, Mud, Other non-soluble deposits etc.

neoplast® Cooler Mixers descaling process can be accomplishing by two methods.

1. Descaling via Chemical Circulation Process (Descaling Agent). (Fast, Cost effective & Less labour)
2. Descaling via dismantling vessel Jacket. (Time Consuming, Costly & Labour Intensive)

***Method -1*: Descaling via Chemical Circulation Process (Using Descaling Agent)**

To adopt this method, it is mandatory to repeat this process periodically every 3 to 4 months starting from the 1st day of installation or immediately after Method-2 is performed. Descaling Chemicals available in the market are only capable of removing oxide deposits up to certain extent. If the Vessel Jacket is totally blocked / choked, this process will not work and Method-2 has to be performed compulsory.

One of the advantages of using Chemical Descalers periodically can clean the machine in place, reducing workload & cost. A good quality descaling chemical should offer Low Corrosion rate & besides removing sediments it also flushes oil & other debris that has been mixed internally.

Below are the full lines of recommended Chemical Descalers specifically formulated for cleaning Steel & water system.

Dew Speciality Chemicals (P) Ltd (www.dewindia.com)

Steps for performing Descaling Process in neoplast® Cooler Mixers

***Step – 1*:**

Stop the Cooler Vessel Water circulation process & drain the vessel & lid with Drain Port provided at the bottom of the vessel. Don not forget to close the drain port once vessel is drained. Remove Inlet & outlet connections from main headers.

***Step – 2*:**

Procure a good effective Descaling Agent as per the quantity needed for your cooler mixer model & prepare the Batch as per below recommended details in a suitable capacity container. Generally a good descaling agent costs around *Rs.75* to *Rs.85* per litre.

Descaling Batch Preparation process:

Descaling Agents has to be diluted along with water proportionately & sequentially. Generally total descaling agent quantity addition should be approx. 15% to 20% of the total volume of water.

For Example if water volume is 100 Ltr, Total Descaling Agent addition should be 15 Ltr (i.e. 15%). Total Descaling Batch will be 115 Ltr. Descaling Agent quantity has to added at specific interval & not all at once to achieve better results & low foaming effect.

Below is the Total Batch wise volume as per cooler mixer models.

Mixer Model	HCM-800	HCM-1200	HCM-1800	HCM-2700	HCM-4600
Water Vol.	140 Ltr.	200 Ltr.	280 Ltr.	340 Ltr.	660 Ltr.
Suggested Descaling Agent Vol. @ 15%	21 Ltr.	30 Ltr.	42 Ltr.	51 Ltr.	99 Ltr.
TOTAL DESCALING BATCH SIZE	**161 Ltr.**	**230 Ltr.**	**322 Ltr.**	**391 Ltr.**	**759 Ltr.**

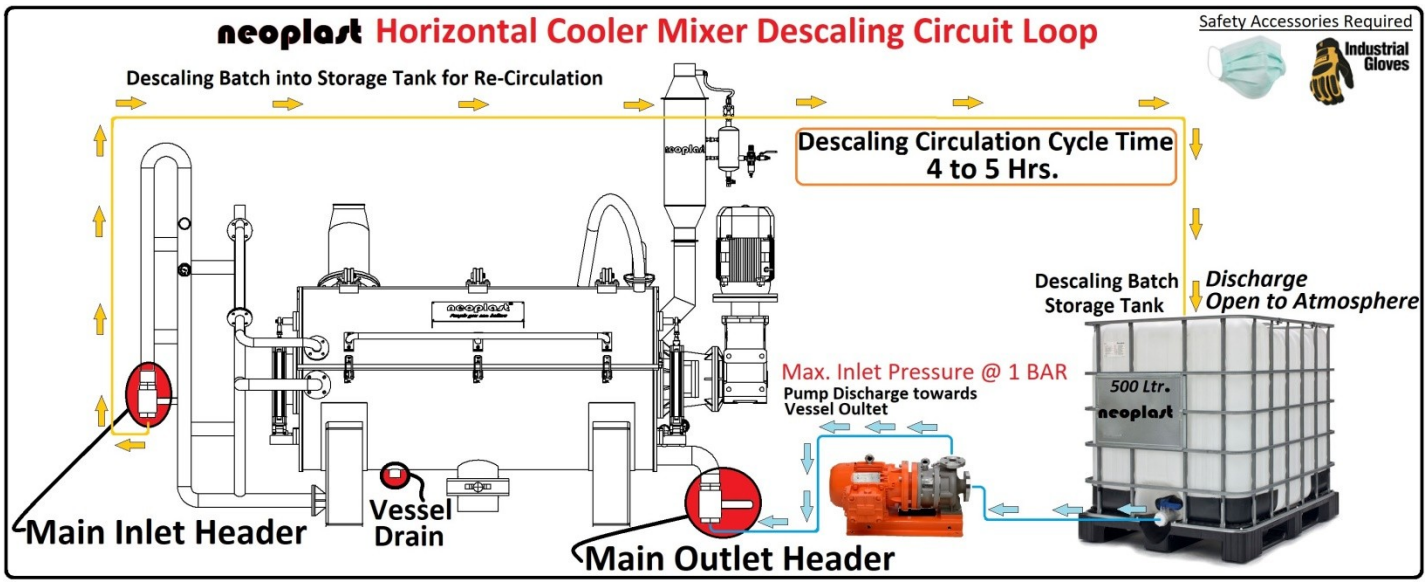
Step – 3:

Procure a stainless steel or Polypropylene circulation pump as Descaling agents are typically acidic compounds such as hydrochloric acid that react with the alkaline carbonate compounds present in the scale, producing carbon dioxide gas and a soluble salt. Suggested Pump ratings & required flow rate for descaling process are as below:

Mixer Model	HCM-800	HCM-1200	HCM-1800	HCM-2700	HCM-4600
Req. Flow Rate	9M³/Hr. (150 LPM)	12M³/Hr. (200 LPM)	18M³/Hr. (300 LPM)	27M³/Hr. (450 LPM)	45M³/Hr. (750 LPM)
Suggested HP Pump	1HP / 1½ HP	1HP / 1½ HP	2HP / 2½HP	2HP / 2½HP	3HP / 5HP

Step – 4:

Install the pump with the Descaling tank and connect the system with the cooler mixer Outlet Header. Do not connect the system on Inlet Header as descaling performance would be much efficient if it is descaled from reverse direction. Connect the Main Inlet Header to the Descaling Batch storage tank. It should be a close loop system. Please refer to below diagram for your ready reference.



***Step – 5*:**

Once the Close Loop system is ready, run the cycle as per below recommended Table:

Mixer Model	HCM-800	HCM-1200	HCM-1800	HCM-2700	HCM-4600
Water Vol.	140 Ltr.	200 Ltr.	280 Ltr.	340 Ltr.	650 Ltr.
1st Dosage of Descaling Agent	5.25 Ltr.	7.5 Ltr.	10.5 Ltr.	12.75 Ltr.	24.75 Ltr.
1st Batch Size	***145.25 Ltr.***	***207.5 Ltr.***	***290.5 Ltr.***	***352.75 Ltr.***	***674.75 Ltr.***
Start the Descaling Process & Run continuously for ***1 HOUR***. After 1 Hour add 2nd Dosage as below					
2st Dosage of Descaling Agent	5.25 Ltr.	7.5 Ltr.	10.5 Ltr.	12.75 Ltr.	24.75 Ltr.
Start the Descaling Process & run continuously for again ***1 HOUR***. After 1 Hour add 3rd Dosage as below					
3rd Dosage of Descaling Agent	5.25 Ltr.	7.5 Ltr.	10.5 Ltr.	12.75 Ltr.	24.75 Ltr.
Start the Descaling Process & run continuously for again ***1 HOUR***. After 1 Hour add 4th Dosage as below					
4th Dosage of Descaling Agent	5.25 Ltr.	7.5 Ltr.	10.5 Ltr.	12.75 Ltr.	24.75 Ltr.
Start the Descaling Process & run continuously for again ***1 HOUR***. *Total Descaling Cycle Time would be 4 Hours.*					
Final Batch Size	***161 Ltr.***	***230 Ltr.***	***322 Ltr.***	***391 Ltr.***	***759 Ltr.***

***Step – 6*:**

Once the descaling process is completed, thoroughly flush the system & vessel with clean water to avoid contamination and residue of the descaling agent. Remember, it is wise to flush out the agent from the system especially pump as you would be using the system in another 3-4 months.

***Remember, Periodically** Descaling Process not only lengthens the life of cooling system but also provide optimum cooling efficiency by heat transfer prohibiting scale build up and inhibiting corrosion.* neoplast® *recommends all end-users to promote this process every 3-4 months a year.*

***Method -2*:** Descaling via dismantling vessel Jacket. (Time Consuming, Costly & Labour Intensive)

This method should only be conducted if Method-1 has not been performed & the Vessel is totally choked up & cooling efficiency has been drastically reduced. We recommend customers to send the vessel to our manufacturing facility for performing this method as on-site dismantling needs special skills, process, tools & equipment's like Plasma Machine/Argon Wielding/Grinders etc. which are generally not available in a processing industry.

This method includes laborious process of cutting the vessel jacked from its pre-specified locations and removing the scale manually by hand. Total weight of the vessel before starting the process & after completion of process has been recorded to get the idea of the amount of scale deposition in the vessel. Once the scale is removed, the vessel is re-wielded and a thorough Hydro-Test @ 2 Bar is conducted for leakage test.

Contact Neoplast for further information regarding Method-2 process.