Air Dryer Test Bench:

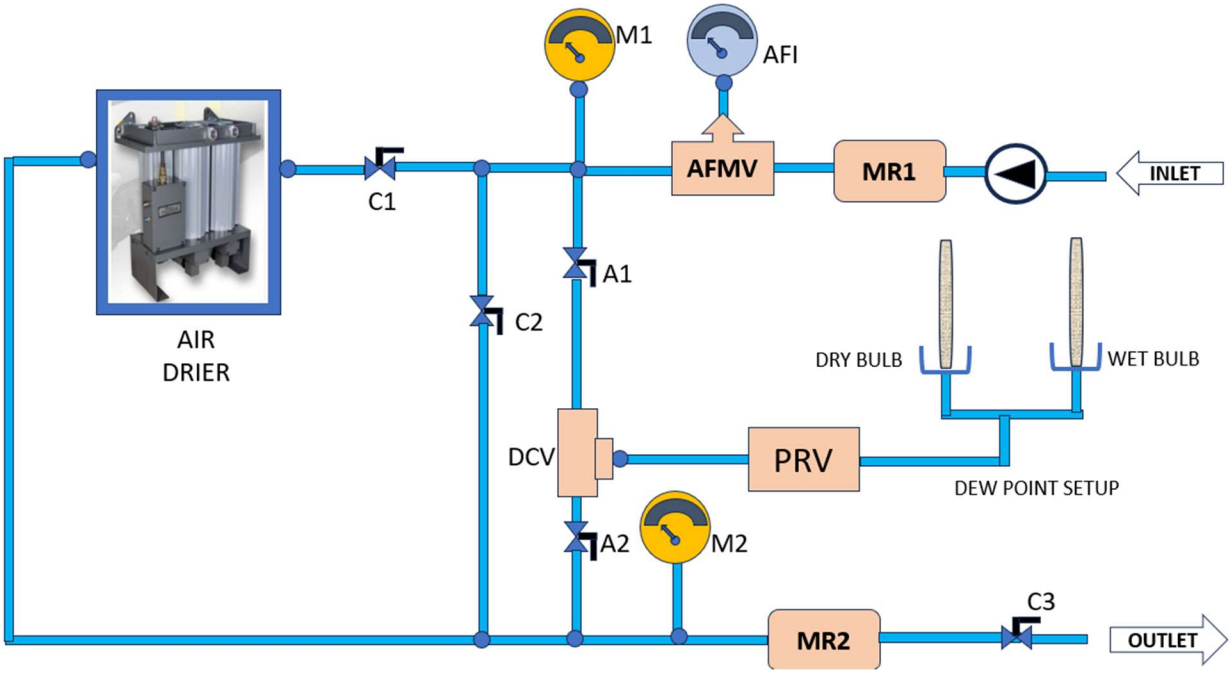
During the Month of August-2023 **Air Dryer Test Bench** has been made using inhouse resources by the shed staff.

Clean and dry air is the requirement of locomotive for trouble free operation. For this Heat less regenerative twin tower type Air dryer is fitted in locomotive.

In this setup efficacy of air dryer is tested during overhauling of Air dryer.

In this test setup two nos. mercurry bulb thermometer are used in two different chamber.
One chamber with thermometer is kept dry and readings of this thermometer is called dry bulb temperature (Tdb). The other chamber is provided with some water and cotton waste soaked with water and wrapped around the thermometer bulb. The readings of this thermometer is called wet bulb temperature (Twb).

These two chambers are connected as shown in the schematic diagram of test bench. Pressure reducing valve (PRV) with gauge is adjusted to provide pressure of 0.2 kg/cm^2.



Then

The inlet and outlet Air dew point temperature is calculated as below:

Finding Inlet air dew point temperature (TI):

To find inlet air dew point temperature open the cock A1 and kept cock A2 in closed position. Allowed the air from PRV to flow into the dry bulb and wet bulb chambers for 15 minutes to get stable readings. Taken readings of Tdb & Twb. **Then** Calculate the inlet air wet bulb depression **as (Tdb**-Twb). Now by using the table as shown below, find the inlet dew point temperature value corresponding to inlet air dry bulb temperature (Tdb) and inlet air wet bulb depression (Tdb-Twb).

Finding Outlet air dew point temperature (T2):

To find outlet air dew point temperature open cock A2 and keep cock A1 in closed position. Allow the air from PRV to flow into the dry bulb and wer bulb chambers for 15 minutes to get the stable readings. Take readings of Tdb & Twb. Then Calculate the outlet air wet bulb depression as (Tdb-Twb). Now by using the table as shown below, find the outlet air dew point temperature value corresponding to outlet air dry bulb temperature (Tdb) and outlet air wet bulb depression (Tdb-Twb).

Then finally Dew point Depression of air dryer=T1-T2 is calculated, which should be **≥30^{0}c** for new /Overhauled (new desiccant) and **≥15^{0}c** after 1 year service life.

Dry Bulb (°C)	Wet Bulb Depression, °C (Dry Bulb Temperature Minus Wet Bulb Temperature = Wet Bulb Depression)																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
−20	−33																					
−18	−28																					
−16	−24																					
−14	−21	−36																				
−12	−18	−28																				
−10	−14	−22																				
−8	−12	−18	−29																			
−6	−10	−14	−22																			
−4	−7	−22	−17	−29																		
−2	−5	−8	−13	−20																		
0	−3	−6	−9	−15	−24																	
2	−1	−3	−6	−11	−17																	
4	1	−1	−4	−7	−11	−19																
6	4	1	−1	−4	−7	−13	−21															
8	6	3	1	−2	−5	−9	−14															
10	8	6	4	1	−2	−5	−9	−14	−28													
12	10	8	6	4	1	−2	−5	−9	−16													
14	12	11	9	6	4	1	−2	−5	−10	−17												
16	14	13	11	9	7	4	1	−1	−6	−10	−17											
18	16	15	13	11	9	7	4	2	−2	−5	−10	−19										
20	19	17	15	14	12	10	7	4	2	−2	−5	−10	−19									
22	21	19	17	16	14	12	10	8	5	3	−1	−5	−10	−19								
24	23	21	20	18	16	14	12	10	8	6	2	−1	−5	−10	−18							
26	25	23	22	20	18	17	15	13	11	9	6	3	0	−4	−9	−18						
28	27	25	24	22	21	19	17	16	14	11	9	7	4	1	−3	−9	−16					
30	29	27	26	24	23	21	19	18	16	14	12	10	8	5	1	−2	−8	−15				
32	31	29	28	27	25	24	22	21	19	17	15	13	11	8	5	2	−2	−7	−14			
34	33	31	30	29	27	26	24	23	21	20	18	16	14	12	9	6	3	−1	−5	−12	−29	
36	35	33	32	31	29	28	27	25	24	22	20	19	17	15	13	10	7	4	0	−4	−10	
38	37	35	34	33	32	30	29	28	26	25	23	21	19	17	15	13	11	8	5	1	−3	−9
40	39	37	36	35	34	32	31	30	28	27	25	24	22	20	18	16	14	12	9	6	2	−2

Dry Bulb (Air) Temperature

Wet bulb depression

Dew point temperatures