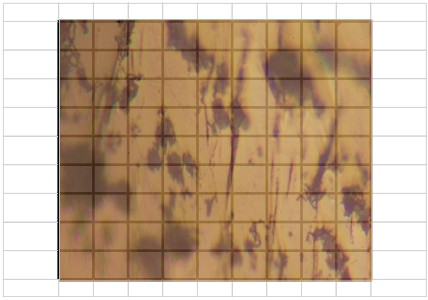
LAMPIRAN

❖ Perhitungan presentase ferite perlite struktur mikro

➢ Tanpa preheating



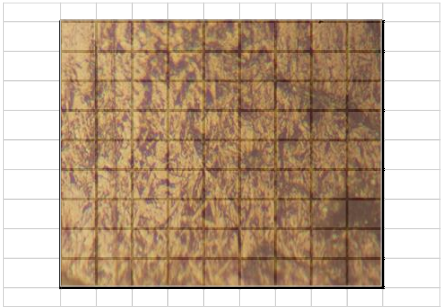
Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{18}{100}$ x 100% = 18%

Presentase ferrite = 100% - presentase perlit

= 100% - 18% = 82 %

➢ Preheating 160˚C waktu tahan 7menit



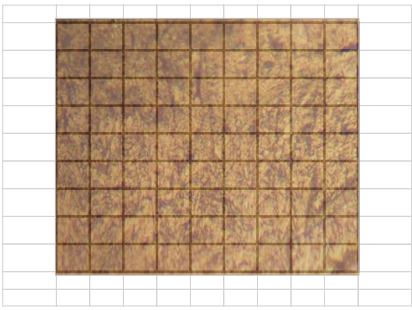
Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{38}{100}$ x 100% = 38%

Presentase ferrite = 100% - presentase perlit

= 100% - 38% = 62 %

- **Preheating 160˚C waktu tahan 15menit**



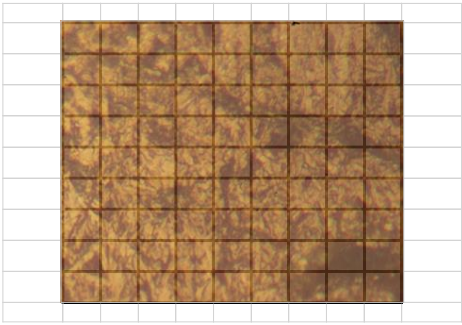
Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{51}{100}$ x 100% = 51%

Presentase ferrite = 100% - presentase perlit

= 100% - 51% = 49 %

- **Preheating 160˚C waktu tahan 20menit**



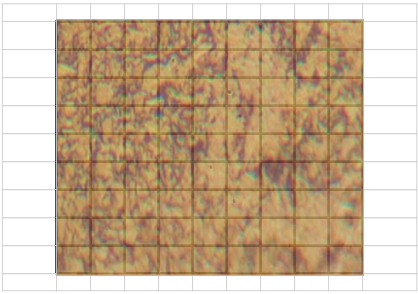
Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{58}{100}$ x 100% = 58%

Presentase ferrite = 100% - presentase perlit

= 100% - 58% = 42 %

- **Preheating 210°C waktu tahan 7menit**



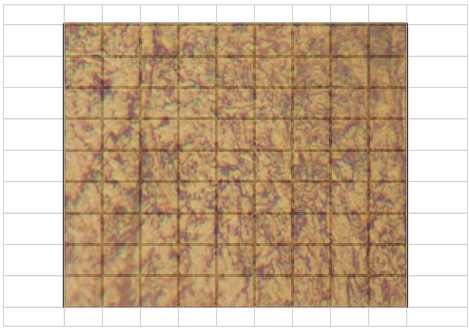
Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{45}{100}$ x 100% = 45%

Presentase ferrite = 100% - presentase perlit

= 100% - 45% = 55 %

- **Preheating 210°C waktu tahan 15menit**



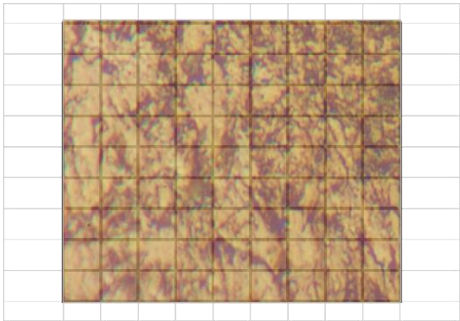
Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{56}{100}$ x 100% = 56%

Presentase ferrite = 100% - presentase perlit

= 100% - 56% = 44 %

- **Preheating 210˚C waktu tahan 20menit**



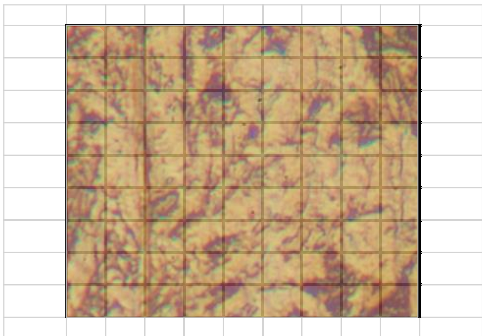
Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{66}{100}$ x 100% = 66%

Presentase ferrite = 100% - presentase perlit

= 100% - 66% = 34 %

- **Preheating 260˚C waktu tahan 7menit**



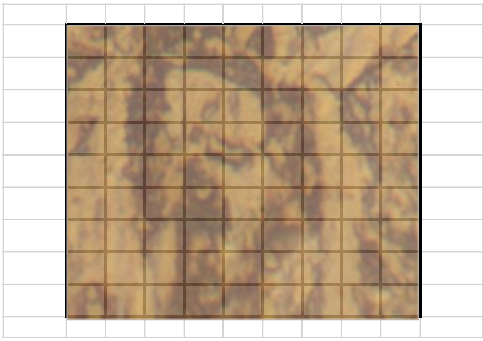
Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{49}{100}$ x 100% = 49%

Presentase ferrite = 100% - presentase perlit

= 100% - 49% = 51 %

- **Preheating 260˚C waktu tahan 15menit**



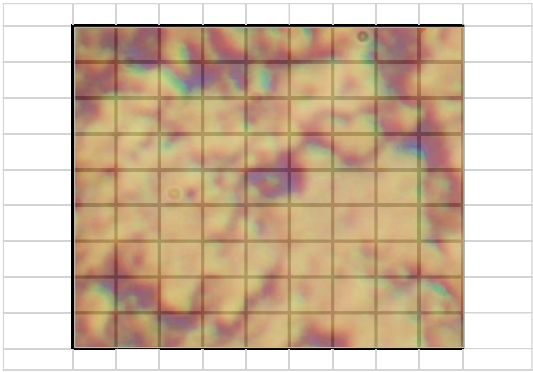
Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{62}{100}$ x 100% = 62%

Presentase ferrite = 100% - presentase perlit

= 100% - 62% = 38 %

- **Preheating 260°C waktu tahan 20menit**



Presentase perlit = $\frac{jumlah\ fasa\ perlit}{jumlah\ titik}$ x 100%

=$\frac{71}{100}$ x 100% = 71%

Presentase ferrite = 100% - presentase perlit

= 100% - 71% = 29 %

❖ **Perhitungan Pengujian kekerasan**

Pengujian kekerasan dilakukan dengan menggunakan mesin rockwell indentor C, hasil dari pengujian adalah untuk mencari nilai rata rata kekerasan benda uji, hasil yang diperoleh dapat dilihat pada table dibawah ini :

Waktu Preheat	Kondisi Indentitas	Indentitas	Nilai Kekerasan Rockwell	Nilai Rata Rata Kekerasan Rockwell
7MENIT	P = 150kg t = 5sec	Kerucut Intan	48	51,7
			56	
			50	
			50,5	
			54,5	

Waktu Preheat	Kondisi Indentitas	Indentitas	Nilai Kekerasan Rockwell	Nilai Rata Rata Kekerasan Rockwell
15MENIT	P = 150kg t = 5sec	Kerucut Intan	55	54,2
			49	
			57,5	
			55	
			54,5	

Waktu Preheat	Kondisi Indentitas	Indentitas	Nilai Kekerasan Rockwell	Nilai Rata Rata Kekerasan Rockwell
20MENIT	P = 150kg t = 5sec	Kerucut Intan	56	55,2
			50,5	
			56,5	
			57,5	
			55,5	

Nilai kekerasan untuk ASTM A53 160˚C

1. 7menit
   HRC = 48+56+50+50,5+54,5
   HRCrata-rata = 258,5 : 5 = 51,7
2. 15menit
   HRC = 55+49+57,5+55+54,5
   HRCrata-rata = 271:5 = 54,2
3. 20menit
   HRC = 56+50,5+56,5+57,5+55,5
   HRCrata-rata = 276:5 = 55,2

Waktu Preheat	Kondisi Indentitas	Indentitas	Nilai Kekerasan Rockwell	Nilai Rata Rata Kekerasan Rockwell
7MENIT	P = 150kg t = 5sec	Kerucut Intan	53	52,4
			55,5	
			46,5	
			51,5	
			55,5	

Waktu Preheat	Kondisi Indentitas	Indentitas	Nilai Kekerasan Rockwell	Nilai Rata Rata Kekerasan Rockwell
15MENIT	P = 150kg t = 5sec	Kerucut Intan	55,5	54,56
			53,5	
			50,5	
			54,5	
			58,5	

Waktu Preheat	Kondisi Indentitas	Indentitas	Nilai Kekerasan Rockwell	Nilai Rata Rata Kekerasan Rockwell
20MENIT	P = 150kg t = 5sec	Kerucut Intan	56,5	55,3
			53	
			55	
			55,5	
			56.5	

Nilai Kekerasan untuk ASTM A53 210˚C

1. 7menit
   HRC = 53+55,5+46,5+51,5+55,5
   HRCrata-rata = 265:5 = 52,4
2. 15menit
   HRC = 55,5+53,5+50,5+54,5+58,5
   HRCrata-rata = 272,5:5 = 54,56
3 20menit
   HRC = 56,5+53+55+55,5+56,5
   HRCrata-rata = 276:5 = 55,3

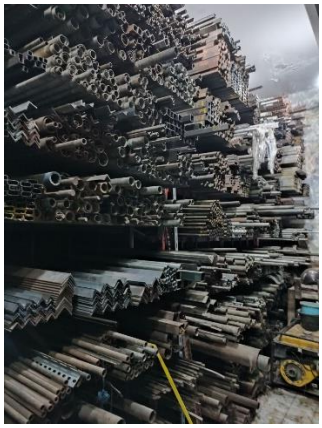
Waktu Preheat	Kondisi Indentitas	Indentitas	Nilai Kekerasan Rockwell	Nilai Rata Rata Kekerasan Rockwell
7MENIT	P = 150kg t = 5sec	Kerucut Intan	55,5	56,3
			56,5	
			56	
			59	
			54,5	

Waktu Preheat	Kondisi Indentitas	Indentitas	Nilai Kekerasan Rockwell	Nilai Rata Rata Kekerasan Rockwell
15MENIT	P = 150kg t = 5sec	Kerucut Intan	59,5	56,6
			57,5	
			55	
			56	
			55	
Waktu Preheat	Kondisi Indentitas	Indentitas	Nilai Kekerasan Rockwell	Nilai Rata Rata Kekerasan Rockwell
20MENIT	P = 150kg t = 5sec	Kerucut Intan	59,5	57,8
			57,5	
			56,5	
			60	
			55,5	

Nilai kekerasan ASTM A53 260˚C

1. 7menit
   HRC = 55,5+56,5+56+59+54,5
   HRCrata-rata = 281,5:5 = 56,3
2. 15menit
   HRC = 59,5+57,5+55+56+55
   HRCrata-rata 283:5 = 56,5
3. 20menit
   HRC = 59,5+57,5+56,5+60+55,5
   HRCrata-rata = 289:5 = 57,8

No.Spesimen	Nilai rata-rata HRC	keterangan
1	52,7	Tanpa preheating
2	51,7	160˚C / 7menit
3	54,2	160˚ / 15menit
4	55,2	160˚C / 20menit
5	52,4	210˚C / 7menit
6	54,5	210˚C / 15menit
7	55,3	210˚C / 20menit
8	56,3	260˚C / 7menit
9	56,6	260˚C / 15menit
10	57,8	260˚C / 20menit

1A
3B
2A
2B
3C
2C
1C

3C