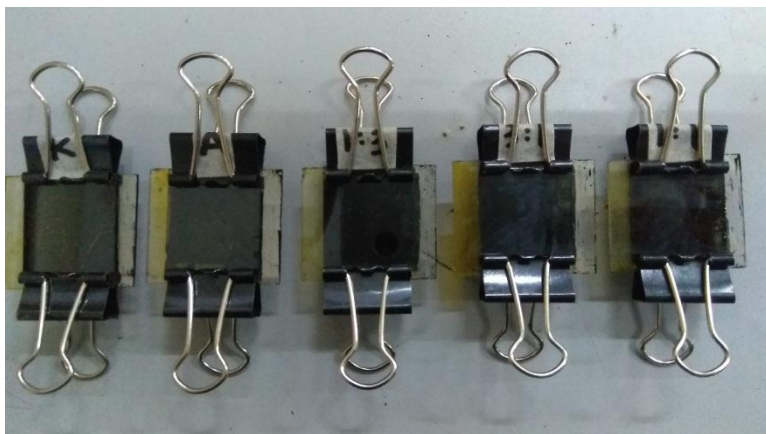
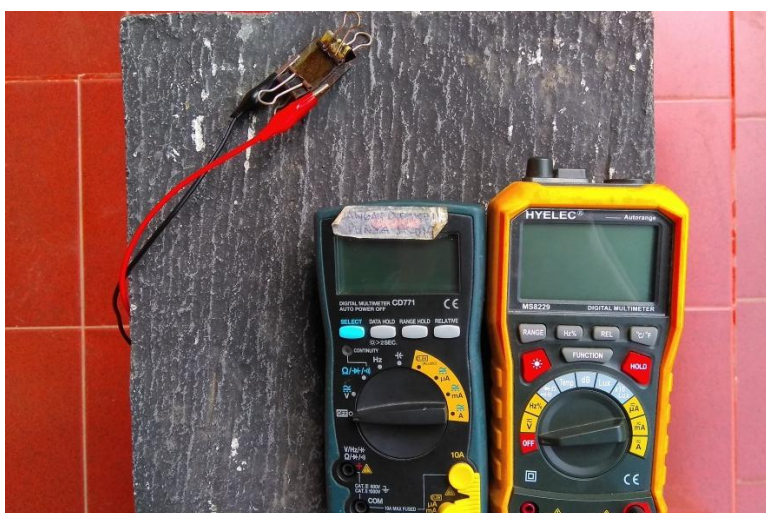


LAMPIRAN 1
DOKUMENTASI

Hasil Perakitan DSSC



Proses Pengujian Tegangan dan Arus dengan Matahari AM 1,5



Panjang bayangan saat AM 1,5 (08.15 - 08.30 WIB)





Proses Pengujian Tegangan dan Arus dengan Menggunakan Lampu LED *Cool Daylight 7*

Watt



LAMPIRAN 2
RAW DATA ABSORBANSI

KLOROFIL

λ (nm)	Abs. (au)
400	4,000
401	3,902
402	3,981
403	4,000
404	3,965
405	3,987
406	3,970
407	3,979
408	3,992
409	3,992
410	3,986
411	4,000
412	4,000
413	4,000
414	3,906
415	3,995
416	3,945
417	3,818
418	3,891
419	3,936
420	3,931
421	3,788
422	3,849
423	3,924
424	3,845
425	3,865
426	3,852
427	3,962
428	3,923
429	3,763
430	3,854
431	3,863
432	3,839
433	3,883
434	3,801
435	3,858
436	3,914
437	3,892
438	3,867
439	3,790
440	3,890
441	3,916
442	3,983
443	3,890
444	3,975

λ (nm)	Abs. (au)
445	3,949
446	3,942
447	3,883
448	3,686
449	3,714
450	3,680
451	3,575
452	3,647
453	3,504
454	3,491
455	3,427
456	3,393
457	3,401
458	3,373
459	3,368
460	3,341
461	3,363
462	3,357
463	3,396
464	3,429
465	3,426
466	3,408
467	3,364
468	3,389
469	3,344
470	3,299
471	3,238
472	3,187
473	3,085
474	3,001
475	2,899
476	2,796
477	2,665
478	2,546
479	2,421
480	2,293
481	2,169
482	2,038
483	1,912
484	1,780
485	1,656
486	1,538
487	1,428
488	1,323
489	1,221

λ (nm)	Abs. (au)
490	1,131
491	1,044
492	0,966
493	0,899
494	0,834
495	0,779
496	0,728
497	0,681
498	0,640
499	0,605
500	0,572
501	0,544
502	0,519
503	0,497
504	0,477
505	0,461
506	0,445
507	0,430
508	0,415
509	0,401
510	0,387
511	0,373
512	0,359
513	0,346
514	0,334
515	0,323
516	0,314
517	0,306
518	0,300
519	0,296
520	0,293
521	0,291
522	0,291
523	0,292
524	0,294
525	0,297
526	0,301
527	0,307
528	0,313
529	0,321
530	0,330
531	0,340
532	0,349
533	0,359
534	0,368

λ (nm)	Abs. (au)
535	0,375
536	0,379
537	0,381
538	0,381
539	0,378
540	0,374
541	0,367
542	0,360
543	0,353
544	0,346
545	0,339
546	0,333
547	0,329
548	0,325
549	0,323
550	0,322
551	0,323
552	0,324
553	0,326
554	0,329
555	0,334
556	0,338
557	0,344
558	0,350
559	0,358
560	0,365
561	0,373
562	0,382
563	0,391
564	0,400
565	0,409
566	0,419
567	0,429
568	0,438
569	0,448
570	0,456
571	0,465
572	0,473
573	0,480
574	0,488
575	0,496
576	0,504
577	0,511
578	0,519
579	0,526

λ (nm)	Abs. (<i>au</i>)
580	0,533
581	0,541
582	0,548
583	0,555
584	0,561
585	0,568
586	0,573
587	0,579
588	0,585
589	0,590
590	0,597
591	0,604
592	0,611
593	0,621
594	0,633
595	0,645
596	0,661
597	0,678
598	0,697
599	0,718
600	0,740
601	0,762
602	0,784
603	0,807
604	0,830
605	0,850
606	0,871
607	0,890
608	0,908
609	0,923
610	0,937
611	0,949
612	0,958
613	0,964
614	0,968
615	0,970
616	0,969
617	0,966
618	0,962
619	0,957
620	0,950
621	0,943
622	0,935
623	0,926
624	0,918
625	0,911

λ (nm)	Abs. (<i>au</i>)
626	0,903
627	0,897
628	0,892
629	0,888
630	0,888
631	0,891
632	0,898
633	0,909
634	0,925
635	0,946
636	0,972
637	1,004
638	1,042
639	1,084
640	1,132
641	1,186
642	1,244
643	1,308
644	1,377
645	1,448
646	1,523
647	1,608
648	1,698
649	1,794
650	1,900
651	2,016
652	2,143
653	2,272
654	2,414
655	2,556
656	2,692
657	2,818
658	2,922
659	2,994
660	3,039
661	3,068
662	3,081
663	3,087
664	3,084
665	3,072
666	3,058
667	3,036
668	3,008
669	2,951
670	2,874
671	2,766

λ (nm)	Abs. (<i>au</i>)
672	2,610
673	2,413
674	2,196
675	1,965
676	1,731
677	1,514
678	1,305
679	1,117
680	0,950
681	0,808
682	0,684
683	0,577
684	0,484
685	0,409
686	0,344
687	0,290
688	0,245
689	0,208
690	0,178
691	0,153
692	0,132
693	0,114
694	0,099
695	0,087
696	0,078
697	0,069
698	0,062
699	0,056
700	0,051

ANTOSIANIN

λ (nm)	Abs. (<i>au</i>)
400	1,115
401	1,110
402	1,104
403	1,100
404	1,096
405	1,092
406	1,089
407	1,086
408	1,083
409	1,081
410	1,079
411	1,078
412	1,076
413	1,075
414	1,074
415	1,074
416	1,073
417	1,072
418	1,071
419	1,071
420	1,070
421	1,070
422	1,069
423	1,069
424	1,068
425	1,067
426	1,067
427	1,066
428	1,065
429	1,065
430	1,064
431	1,064
432	1,064
433	1,064
434	1,064
435	1,065
436	1,066
437	1,066
438	1,066
439	1,067
440	1,068
441	1,068
442	1,068

λ (nm)	Abs. (<i>au</i>)
443	1,069
444	1,069
445	1,069
446	1,070
447	1,071
448	1,071
449	1,072
450	1,072
451	1,073
452	1,073
453	1,073
454	1,074
455	1,075
456	1,075
457	1,076
458	1,078
459	1,079
460	1,080
461	1,082
462	1,083
463	1,085
464	1,088
465	1,090
466	1,093
467	1,096
468	1,099
469	1,103
470	1,107
471	1,111
472	1,115
473	1,119
474	1,123
475	1,127
476	1,132
477	1,137
478	1,142
479	1,146
480	1,151
481	1,157
482	1,162
483	1,167
484	1,173
485	1,179

λ (nm)	Abs. (<i>au</i>)
486	1,185
487	1,191
488	1,198
489	1,205
490	1,211
491	1,219
492	1,226
493	1,233
494	1,241
495	1,248
496	1,256
497	1,264
498	1,272
499	1,280
500	1,288
501	1,295
502	1,304
503	1,312
504	1,320
505	1,327
506	1,335
507	1,343
508	1,350
509	1,358
510	1,365
511	1,373
512	1,380
513	1,387
514	1,395
515	1,401
516	1,408
517	1,414
518	1,420
519	1,427
520	1,432
521	1,438
522	1,443
523	1,447
524	1,451
525	1,455
526	1,459
527	1,462
528	1,464

λ (nm)	Abs. (<i>au</i>)
529	1,466
530	1,468
531	1,469
532	1,470
533	1,469
534	1,469
535	1,468
536	1,464
537	1,459
538	1,456
539	1,452
540	1,447
541	1,441
542	1,435
543	1,428
544	1,421
545	1,412
546	1,404
547	1,394
548	1,384
549	1,374
550	1,363
551	1,352
552	1,340
553	1,328
554	1,316
555	1,303
556	1,290
557	1,277
558	1,264
559	1,249
560	1,236
561	1,222
562	1,208
563	1,194
564	1,180
565	1,166
566	1,152
567	1,137
568	1,124
569	1,109
570	1,097
571	1,084

λ (nm)	Abs. (au)
572	1,071
573	1,058
574	1,045
575	1,032
576	1,020
577	1,008
578	0,995
579	0,983
580	0,971
581	0,958
582	0,946
583	0,933
584	0,921
585	0,908
586	0,896
587	0,884
588	0,871
589	0,858
590	0,846
591	0,834
592	0,821
593	0,809
594	0,796
595	0,785
596	0,772
597	0,760
598	0,748
599	0,737
600	0,725
601	0,714
602	0,703
603	0,693
604	0,682
605	0,672
606	0,661
607	0,652
608	0,642
609	0,633
610	0,623
611	0,614
612	0,606
613	0,597
614	0,589
615	1,071
616	0,574
617	0,567

λ (nm)	Abs. (au)
618	0,560
619	0,554
620	0,547
621	0,541
622	0,536
623	0,530
624	0,525
625	0,521
626	0,516
627	0,512
628	0,507
629	0,503
630	0,500
631	0,496
632	0,492
633	0,489
634	0,485
635	0,482
636	0,479
637	0,476
638	0,474
639	0,471
640	0,469
641	0,467
642	0,465
643	0,463
644	0,461
645	0,459
646	0,458
647	0,456
648	0,455
649	0,454
650	0,453
651	0,452
652	0,451
653	0,450
654	0,449
655	0,448
656	0,447
657	0,446
658	0,445
659	0,444
660	0,443
661	0,442
662	0,442
663	0,441

λ (nm)	Abs. (au)
664	0,440
665	0,439
666	0,438
667	0,437
668	0,436
669	0,435
670	0,434
671	0,433
672	0,432
673	0,431
674	0,430
675	0,429
676	0,427
677	0,426
678	0,425
679	0,423
680	0,422
681	0,421
682	0,420
683	0,419
684	0,417
685	0,416
686	0,415
687	0,414
688	0,413
689	0,412
690	0,412
691	0,411
692	0,410
693	0,409
694	0,408
695	0,408
696	0,407
697	0,406
698	0,406
699	0,405
700	0,405

ANTOSIANIN : KLOROFIL 1 : 3

λ (nm)	Abs. (au)
400	4,000
401	4,000
402	4,000
403	4,000
404	3,999
405	4,000
406	4,000
407	4,000
408	4,000
409	4,000
410	3,999
411	4,000
412	3,975
413	4,000
414	4,000
415	4,000
416	3,997
417	4,000
418	3,977
419	3,937
420	3,996
421	3,996
422	3,981
423	3,950
424	3,938
425	3,943
426	3,682
427	3,436
428	3,344
429	3,231
430	3,103
431	3,010
432	2,985
433	2,927
434	2,877
435	2,879
436	2,845
437	2,868
438	2,862
439	2,857
440	2,845
441	2,845
442	2,836

λ (nm)	Abs. (au)
443	2,832
444	2,840
445	2,840
446	2,829
447	2,827
448	2,827
449	2,825
450	2,817
451	2,809
452	2,814
453	2,791
454	2,800
455	2,801
456	2,801
457	2,799
458	2,797
459	2,815
460	2,825
461	2,834
462	2,840
463	2,854
464	2,855
465	2,855
466	2,849
467	2,845
468	2,833
469	2,805
470	2,779
471	2,742
472	2,691
473	2,636
474	2,576
475	2,500
476	2,429
477	2,346
478	2,259
479	2,171
480	2,078
481	1,981
482	1,883
483	1,790
484	1,691
485	1,598

λ (nm)	Abs. (au)
486	1,509
487	1,424
488	1,345
489	1,271
490	1,208
491	1,147
492	1,096
493	1,053
494	1,013
495	0,981
496	0,953
497	0,928
498	0,908
499	0,891
500	0,875
501	0,862
502	0,850
503	0,840
504	0,831
505	0,824
506	0,815
507	0,805
508	0,793
509	0,778
510	0,759
511	0,737
512	0,713
513	0,688
514	0,663
515	0,640
516	0,618
517	0,599
518	0,582
519	0,569
520	0,557
521	0,549
522	0,543
523	0,540
524	0,540
525	0,542
526	0,548
527	0,558
528	0,570

λ (nm)	Abs. (au)
529	0,586
530	0,606
531	0,627
532	0,650
533	0,674
534	0,696
535	0,715
536	0,727
537	0,732
538	0,732
539	0,724
540	0,709
541	0,690
542	0,667
543	0,643
544	0,619
545	0,595
546	0,575
547	0,556
548	0,540
549	0,528
550	0,518
551	0,510
552	0,505
553	0,500
554	0,497
555	0,494
556	0,492
557	0,490
558	0,488
559	0,486
560	0,483
561	0,479
562	0,475
563	0,471
564	0,466
565	0,460
566	0,455
567	0,449
568	0,443
569	0,437
570	0,432
571	0,427

λ (nm)	Abs. (au)
572	0,422
573	0,417
574	0,413
575	0,410
576	0,407
577	0,404
578	0,402
579	0,401
580	0,401
581	0,401
582	0,402
583	0,403
584	0,406
585	0,409
586	0,414
587	0,419
588	0,425
589	0,433
590	0,441
591	0,450
592	0,461
593	0,473
594	0,486
595	0,499
596	0,515
597	0,531
598	0,546
599	0,562
600	0,578
601	0,592
602	0,604
603	0,615
604	0,623
605	0,628
606	0,631
607	0,631
608	0,629
609	0,624
610	0,616
611	0,606
612	0,595
613	0,581
614	0,566
615	0,550

λ (nm)	Abs. (au)
616	0,533
617	0,517
618	0,501
619	0,486
620	0,471
621	0,458
622	0,446
623	0,437
624	0,43
625	0,424
626	0,421
627	0,420
628	0,422
629	0,426
630	0,433
631	0,443
632	0,456
633	0,472
634	0,491
635	0,512
636	0,536
637	0,563
638	0,592
639	0,624
640	0,659
641	0,697
642	0,737
643	0,778
644	0,821
645	0,864
646	0,908
647	0,954
648	1,000
649	1,046
650	1,093
651	1,142
652	1,193
653	1,247
654	1,308
655	1,373
656	1,440
657	1,516
658	1,596
659	1,672

λ (nm)	Abs. (au)
660	1,747
661	1,818
662	1,880
663	1,928
664	1,958
665	1,967
666	1,954
667	1,917
668	1,862
669	1,783
670	1,685
671	1,576
672	1,454
673	1,325
674	1,198
675	1,071
676	0,944
677	0,827
678	0,716
679	0,617
680	0,529
681	0,455
682	0,391
683	0,336
684	0,288
685	0,248
686	0,215
687	0,188
688	0,166
689	0,148
690	0,133
691	0,120
692	0,110
693	0,101
694	0,094
695	0,088
696	0,083
697	0,079
698	0,075
699	0,072
700	0,069

ANTOSIANIN : KLOROFIL 1 : 1

λ (nm)	Abs. (au)
400	4,000
401	4,000
402	4,000
403	4,000
404	4,000
405	4,000
406	4,000
407	4,000
408	4,000
409	4,000
410	4,000
411	4,000
412	4,000
413	4,000
414	4,000
415	4,000
416	4,000
417	4,000
418	3,954
419	3,980
420	3,995
421	3,996
422	3,960
423	3,983
424	3,926
425	3,539
426	3,401
427	3,324
428	3,216
429	3,150
430	3,043
431	2,987
432	2,961
433	2,934
434	2,921
435	2,911
436	2,915
437	2,911
438	2,914
439	2,898
440	2,901
441	2,883
442	2,846

λ (nm)	Abs. (au)
443	2,822
444	2,781
445	2,763
446	2,731
447	2,690
448	2,658
449	2,622
450	2,586
451	2,544
452	2,508
453	2,461
454	2,418
455	2,378
456	2,335
457	2,297
458	2,262
459	2,227
460	2,201
461	2,182
462	2,159
463	2,146
464	2,136
465	2,128
466	2,123
467	2,122
468	2,118
469	2,115
470	2,108
471	2,101
472	2,089
473	2,075
474	2,057
475	2,032
476	2,004
477	1,973
478	1,936
479	1,896
480	1,853
481	1,808
482	1,759
483	1,711
484	1,661
485	1,611

λ (nm)	Abs. (au)
486	1,564
487	1,517
488	1,475
489	1,434
490	1,399
491	1,366
492	1,338
493	1,316
494	1,295
495	1,279
496	1,265
497	1,254
498	1,245
499	1,238
500	1,232
501	1,227
502	1,223
503	1,220
504	1,218
505	1,216
506	1,213
507	1,210
508	1,205
509	1,198
510	1,189
511	1,177
512	1,164
513	1,149
514	1,135
515	1,122
516	1,109
517	1,097
518	1,088
519	1,081
520	1,075
521	1,071
522	1,069
523	1,068
524	1,069
525	1,072
526	1,077
527	1,084
528	1,092

λ (nm)	Abs. (au)
529	1,104
530	1,118
531	1,133
532	1,150
533	1,167
534	1,183
535	1,197
536	1,207
537	1,211
538	1,212
539	1,208
540	1,198
541	1,185
542	1,168
543	1,149
544	1,130
545	1,111
546	1,093
547	1,076
548	1,062
549	1,049
550	1,039
551	1,030
552	1,022
553	1,016
554	1,010
555	1,004
556	0,999
557	0,994
558	0,988
559	0,982
560	0,976
561	0,970
562	0,962
563	0,955
564	0,947
565	0,938
566	0,930
567	0,920
568	0,912
569	0,902
570	0,894
571	0,885

λ (nm)	Abs. (au)
572	0,876
573	0,868
574	0,860
575	0,852
576	0,845
577	0,839
578	0,832
579	0,827
580	0,821
581	0,816
582	0,812
583	0,808
584	0,805
585	0,802
586	0,800
587	0,799
588	0,799
589	0,800
590	0,801
591	0,804
592	0,807
593	0,811
594	0,816
595	0,821
596	0,827
597	0,833
598	0,839
599	0,845
600	0,851
601	0,856
602	0,860
603	0,862
604	0,863
605	0,861
606	0,858
607	0,853
608	0,846
609	0,837
610	0,826
611	0,815
612	0,801
613	0,787
614	0,772
615	0,756

λ (nm)	Abs. (au)
616	0,739
617	0,723
618	0,708
619	0,693
620	0,679
621	0,666
622	0,654
623	0,644
624	0,635
625	0,628
626	0,621
627	0,616
628	0,613
629	0,611
630	0,611
631	0,612
632	0,615
633	0,620
634	0,626
635	0,634
636	0,643
637	0,655
638	0,669
639	0,684
640	0,702
641	0,722
642	0,744
643	0,769
644	0,797
645	0,827
646	0,860
647	0,897
648	0,935
649	0,974
650	1,016
651	1,060
652	1,106
653	1,154
654	1,206
655	1,260
656	1,313
657	1,371
658	1,430
659	1,486

λ (nm)	Abs. (au)
660	1,541
661	1,592
662	1,636
663	1,670
664	1,691
665	1,697
666	1,687
667	1,661
668	1,622
669	1,565
670	1,497
671	1,420
672	1,336
673	1,246
674	1,158
675	1,071
676	0,982
677	0,901
678	0,823
679	0,753
680	0,692
681	0,639
682	0,594
683	0,554
684	0,519
685	0,491
686	0,467
687	0,448
688	0,431
689	0,418
690	0,407
691	0,397
692	0,390
693	0,384
694	0,378
695	0,374
696	0,370
697	0,367
698	0,364
699	0,362
700	0,360

ANTOSIANIN : KLOROFIL 3 : 1

λ (nm)	Abs. (au)
400	2,807
401	2,784
402	2,778
403	2,744
404	2,779
405	2,751
406	2,775
407	2,765
408	2,772
409	2,787
410	2,775
411	2,778
412	2,795
413	2,771
414	2,784
415	2,745
416	2,731
417	2,687
418	2,647
419	2,601
420	2,541
421	2,494
422	2,437
423	2,379
424	2,329
425	2,259
426	2,207
427	2,153
428	2,105
429	2,066
430	2,033
431	2,007
432	1,988
433	1,978
434	1,972
435	1,968
436	1,970
437	1,971
438	1,972
439	1,969
440	1,966
441	1,958
442	1,949

λ (nm)	Abs. (au)
443	1,934
444	1,921
445	1,905
446	1,889
447	1,871
448	1,850
449	1,830
450	1,808
451	1,784
452	1,758
453	1,733
454	1,704
455	1,677
456	1,651
457	1,624
458	1,597
459	1,575
460	1,555
461	1,537
462	1,525
463	1,514
464	1,507
465	1,503
466	1,502
467	1,502
468	1,504
469	1,507
470	1,510
471	1,513
472	1,515
473	1,515
474	1,513
475	1,509
476	1,503
477	1,495
478	1,484
479	1,472
480	1,457
481	1,441
482	1,424
483	1,405
484	1,385
485	1,366

λ (nm)	Abs. (au)
486	1,347
487	1,329
488	1,311
489	1,295
490	1,281
491	1,268
492	1,258
493	1,250
494	1,243
495	1,238
496	1,234
497	1,232
498	1,231
499	1,231
500	1,232
501	1,233
502	1,234
503	1,237
504	1,240
505	1,243
506	1,245
507	1,248
508	1,250
509	1,251
510	1,251
511	1,250
512	1,249
513	1,246
514	1,244
515	1,242
516	1,240
517	1,239
518	1,238
519	1,238
520	1,239
521	1,241
522	1,242
523	1,245
524	1,248
525	1,252
526	1,256
527	1,261
528	1,267

λ (nm)	Abs. (au)
529	1,274
530	1,281
531	1,288
532	1,297
533	1,305
534	1,313
535	1,320
536	1,323
537	1,324
538	1,324
539	1,322
540	1,316
541	1,309
542	1,299
543	1,288
544	1,277
545	1,265
546	1,253
547	1,241
548	1,230
549	1,219
550	1,209
551	1,199
552	1,190
553	1,181
554	1,173
555	1,163
556	1,154
557	1,145
558	1,136
559	1,126
560	1,116
561	1,105
562	1,095
563	1,084
564	1,073
565	1,061
566	1,049
567	1,037
568	1,026
569	1,013
570	1,003
571	0,991

λ (nm)	Abs. (au)
572	0,979
573	0,968
574	0,957
575	0,945
576	0,934
577	0,924
578	0,913
579	0,903
580	0,893
581	0,883
582	0,873
583	0,863
584	0,854
585	0,844
586	0,835
587	0,827
588	0,818
589	0,810
590	0,802
591	0,795
592	0,787
593	0,781
594	0,774
595	0,768
596	0,762
597	0,756
598	0,750
599	0,745
600	0,739
601	0,733
602	0,726
603	0,719
604	0,711
605	0,703
606	0,694
607	0,684
608	0,674
609	0,662
610	0,650
611	0,638
612	0,625
613	0,612
614	0,598
615	0,585

λ (nm)	Abs. (au)
616	0,571
617	0,559
618	0,547
619	0,535
620	0,523
621	0,513
622	0,502
623	0,493
624	0,485
625	0,478
626	0,471
627	0,465
628	0,460
629	0,455
630	0,451
631	0,448
632	0,446
633	0,444
634	0,444
635	0,444
636	0,445
637	0,447
638	0,449
639	0,453
640	0,458
641	0,464
642	0,471
643	0,480
644	0,491
645	0,503
646	0,516
647	0,532
648	0,550
649	0,568
650	0,587
651	0,608
652	0,629
653	0,651
654	0,676
655	0,700
656	0,725
657	0,752
658	0,779
659	0,804

λ (nm)	Abs. (au)
660	0,828
661	0,850
662	0,869
663	0,884
664	0,893
665	0,895
666	0,890
667	0,879
668	0,861
669	0,836
670	0,805
671	0,772
672	0,734
673	0,694
674	0,654
675	0,614
676	0,575
677	0,538
678	0,503
679	0,471
680	0,442
681	0,417
682	0,396
683	0,377
684	0,360
685	0,346
686	0,335
687	0,325
688	0,316
689	0,309
690	0,303
691	0,298
692	0,294
693	0,290
694	0,287
695	0,284
696	0,282
697	0,280
698	0,278
699	0,277
700	0,275

LAMPIRAN 3
DATASHEET

MATERIAL SAFETY DATA SHEET (MSDS) – TRANSPARENT CONDUCTIVE OXIDE (TCO)

SIGMA-ALDRICH

sigma-aldrich.com

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 4.1 Revision Date 14.01.2012

Print Date 01.05.2014

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : Indium tin oxide coated glass slide, rectangular

Product Number : 636916
Brand : Aldrich
CAS-No. : 50926-11-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Pte Ltd
1 Science Park Road
#02-14 The Capricorn
Singapore Science Park Road II
SINGAPORE 117528
SINGAPORE

Telephone : +65 6779 1200
Fax : +65 6779 1822

1.4 Emergency telephone number

Emergency Phone # : 1-800-262-8200

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]

Skin irritation (Category 2)

Eye irritation (Category 2)

Specific target organ toxicity - single exposure (Category 3)

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Irritating to eyes, respiratory system and skin.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 [CLP]

Pictogram



Signal word : Warning

Hazard statement(s)

H315 : Causes skin irritation.
H319 : Causes serious eye irritation.
H335 : May cause respiratory irritation.

Precautionary statement(s)

P261 : Avoid breathing dust.
P305 + P351 + P338 : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard Statements

none

According to European Directive 67/548/EEC as amended.

Hazard symbol(s)



R-phrases)

R36/37/38

Irritating to eyes, respiratory system and skin.

S-phrases)

S26

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Synonyms : ITO coated slide, rectangular

Component	Classification	Concentration
Diindium trioxide		
CAS-No. 1312-43-2	Skin Irrit. 2; Eye Irrit. 2; STOT SE 3; H315, H319, H335 Xi, R36/37/38	50 - 100 %
EC-No. 215-193-9		
Tin(IV) oxide***		
CAS-No. 18282-10-5	-	10 - 20 %
EC-No. 242-159-0		

* PBT substance, ** vPvB substance, *** WEL substance

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Tin/tin oxides, Indium/indium oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end uses

no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters**

Components with workplace control parameters

8.2 Exposure controls**Appropriate engineering controls**

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment**Eye/face protection**

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection

impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: solid
b) Odour	no data available
c) Odour Threshold	no data available
d) pH	no data available
e) Melting point/freezing point	no data available
f) Initial boiling point and boiling range	no data available
g) Flash point	no data available
h) Evaporation rate	no data available
i) Flammability (solid, gas)	no data available
j) Upper/lower flammability or explosive limits	no data available
k) Vapour pressure	no data available
l) Vapour density	no data available
m) Relative density	1,200 g/cm ³
n) Water solubility	no data available
o) Partition coefficient: n-octanol/water	no data available
p) Autoignition temperature	no data available
q) Decomposition temperature	no data available
r) Viscosity	no data available
s) Explosive properties	no data available
t) Oxidizing properties	no data available

9.2 Other safety information

no data available

10. STABILITY AND REACTIVITY**10.1 Reactivity**

no data available

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Strong oxidizing agents, Potassium, Strong acids, Aluminum, Sodium/sodium oxides, Magnesium

10.6 Hazardous decomposition products

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION**11.1 Information on toxicological effects****Acute toxicity**

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes serious eye irritation.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information

RTECS: Not available

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET (MSDS) – TITANIUM (IV) OXIDE (TiO₂)

SIGMA-ALDRICHsigma-aldrich.com**SAFETY DATA SHEET**

according to Regulation (EC) No. 1907/2006

Version 5.4 Revision Date 13.03.2014

Print Date 01.05.2014

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Titanium(IV) oxide

Product Number : 718467

Brand : Aldrich

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. : 13463-67-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheetCompany : Sigma-Aldrich Pte Ltd
1 Science Park Road
#02-14 The Capricorn
Singapore Science Park Road II
SINGAPORE 117528
SINGAPORE

Telephone : +65 6779 1200

Fax : +65 6779 1822

1.4 Emergency telephone number

Emergency Phone # : 1-800-262-8200

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture**Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.**2.2 Label elements**

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other hazards - none**SECTION 3: Composition/information on ingredients****3.1 Substances**Formula : O₂Ti

Molecular Weight : 79,87 g/mol

CAS-No. : 13463-67-7

EC-No. : 236-675-5

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures**4.1 Description of first aid measures****General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

no data available

SECTION 5: Firefighting measures**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Titanium/titanium oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage**7.1 Precautions for safe handling**

Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: nano particles Colour: white
b) Odour	no data available
c) Odour Threshold	no data available
d) pH	no data available
e) Melting point/freezing point	Melting point/range: 1.850 °C
f) Initial boiling point and boiling range	no data available
g) Flash point	no data available
h) Evaporation rate	no data available
i) Flammability (solid, gas)	no data available
j) Upper/lower flammability or explosive limits	no data available
k) Vapour pressure	no data available
l) Vapour density	no data available
m) Relative density	no data available
n) Water solubility	no data available
o) Partition coefficient: n-octanol/water	no data available
p) Auto-ignition temperature	no data available
q) Decomposition temperature	no data available
r) Viscosity	no data available
s) Explosive properties	no data available
t) Oxidizing properties	no data available

9.2 Other safety information

no data available

SECTION 10: Stability and reactivity**10.1 Reactivity**

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Strong acids

10.6 Hazardous decomposition products

Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information**11.1 Information on toxicological effects****Acute toxicity**

LD50 Oral - rat - > 10.000 mg/kg

LD50 Dermal - rabbit - > 10.000 mg/kg

Skin corrosion/irritation

Skin - Human

Result: Mild skin irritation - 3 h

Serious eye damage/eye irritation

Eyes - rabbit

Result: No eye irritation

Respiratory or skin sensitisation

Will not occur

Germ cell mutagenicity

Hamster

ovary

Micronucleus test

Hamster

Lungs

DNA inhibition

Hamster

ovary

Sister chromatid exchange

mouse

Micronucleus test

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Additional Information

RTECS: XR2275000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information**12.1 Toxicity**

Toxicity to fish

LC50 - other fish - > 1.000 mg/l - 96 h

Aldrich - 718467

Page 5 of 7

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - > 1.000 mg/l - 48 h

EC0 - Daphnia magna (Water flea) - 1.000 mg/l - 48 h

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -

IMDG: -

IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods

IMDG: Not dangerous goods

IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -

IMDG: -

IATA: -

14.4 Packaging group

ADR/RID: -

IMDG: -

IATA: -

14.5 Environmental hazards

ADR/RID: no

IMDG Marine pollutant: no

IATA: no

14.6 Special precautions for user

no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information**Further information**

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Phenom G2 Pro

Phenom™ G2 pro

By using the customer's input and through continuous research, Phenom-World continuously strives to increase the value of the Phenom™ desktop SEM for its users. The Phenom G2 pro is a high end solution suitable for use with a large range of sample holders in a multitude of applications.

Phenom G2 pro

Phenom-World is focused on enabling you to keep up with continuously shrinking feature-sizes and increase your productivity, while bringing down the costs of analysis. The Phenom G2 pro is the most effective, versatile and fastest desktop SEM available. Its unique design makes it suitable for use in a large variety of applications and markets.

The Phenom G2 pro is the most advanced model in the Phenom series. With improved detection hardware, a high brightness source and a state of the art navigation camera, it has become the most powerful desktop SEM. The zoom functionality of the navigation camera reduces the gap between optical and SEM imaging. The SEM magnification range has been increased and now extends from 80 to 45,000 times.

The combination of a touch screen and the option of working with an optical mouse, allows even faster and more accurate navigation with the Phenom G2 pro.

Phenom G2 pro is the platform that offers automated and mechanized accessories such as Pro Suite and active sample holders.

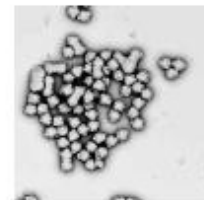
As part of the pro product series every **new** Phenom G2 pro can be upgraded to Phenom proX with EDS at the Phenom-World service hubs.

Pro Suite is an optional application system that has been developed to further enhance the capabilities of the Phenom system. Pro Suite enables maximum information to be extracted from images obtained on the Phenom system. It offers multiple solutions to specific application needs. Pro Suite is a platform containing standard applications such as Automated Image Mapping and Remote User Interface. Additional applications are Fibermetric and 3D Roughness Reconstruction. Virtually all the properties of a sample can be revealed using the Phenom G2 pro and Pro Suite.



Specifications

Items	Description
<ul style="list-style-type: none"> System 	Imaging module, 19" touch-screen monitor, rotary knob, mouse, diaphragm vacuum pump, power supply, USB 2.0 flash drive
<ul style="list-style-type: none"> Imaging Modes <ul style="list-style-type: none"> - Light Optical - Electron Optical 	Magnification: 20 - 120x Magnification range: 80 - 45,000x Digital zoom: max. 12x
<ul style="list-style-type: none"> Illumination <ul style="list-style-type: none"> - Light Optical - Electron Optical <ul style="list-style-type: none"> - Acceleration Voltage - Resolution 	Selectable axial and off-axis LEDs Long-lifetime thermionic source 5 kV 25 nm
<ul style="list-style-type: none"> Digital Image Detection <ul style="list-style-type: none"> - Light Optical - Electron Optical 	Color Navigation Camera High-sensitivity backscattered electron detector (compositional and topographical modes)
<ul style="list-style-type: none"> Image Format Image Resolution Options Pixel Resolution 	JPEG, TIFF, BMP 456 x 456, 684 x 684, 1024 x 1024 and 2048 x 2048 pixels 2.9 nm
<ul style="list-style-type: none"> Data Storage 	USB 2.0 Flash drive
<ul style="list-style-type: none"> Sample Stage Sample Size Sample Loading Time <ul style="list-style-type: none"> - Light Optical - Electron Optical 	Computer-controlled motorized X and Y 25 mm (dia) x 30 mm (h) < 5 s < 30 s
<ul style="list-style-type: none"> Dimensions & Weight <ul style="list-style-type: none"> - Imaging Module - Diaphragm Vacuum Pump - Power Supply - Monitor 	286 (w) x 566 (d) x 495 (h) mm, 50 kg 145 (w) x 220 (d) x 213 (h) mm, 4.5 kg 156 (w) x 300 (d) x 74 (h) mm, 3 kg 375 (w) x 203 (d) x 395 (h) mm, 7.9 kg
<ul style="list-style-type: none"> Ambient Temperature Humidity Power 	15°C ~ 30°C (59°F ~ 86°F) < 80 % RH Single-phase AC 110 - 240 Volt, 50/60 Hz, 300 W (max.)
<ul style="list-style-type: none"> Recommended Table Size 	120 x 75 cm, load rating of 100 kg
<ul style="list-style-type: none"> Upgrade 	The latest models of the Phenom G2 pro series can be upgraded to Phenom proX at the Phenom-World service hubs. Contact your local sales representative for details.



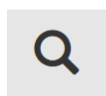
Phenom-World BV, Dillenburgerstraat 9E, 5602 AM Eindhoven, The Netherlands

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PHENOMWORLD

Digital Microscope Dino-Lite AM4115 Series

Highlights



10x - 220x
Optical magnification power



1280 × 1024 pixels
Capture in full detail with resolution up to 1280 × 1024 pixels



USB 2.0
Simple setup



Windows and Mac
Fully compatible with Windows 7, 8, 10 & Mac OS 10.5+ including 32-bit and 64-bit systems.



Annotate & Measure
Use simple tools to draw lines, shapes, and text annotations on the image. Calibrate and measure dimensions including lines, circles, and angles.



Two-year warranty & free tech support
All Dino-Lite microscopes feature a two-year warranty and include free U.S. based tech support for the life of the product.



Language options
Software interface defaults to English and can be changed to any of 25 additional translations.



Barcode reader
Software feature to use camera for reading from QR codes and over 20 other types of barcodes.

Charts

Working distance & field of view mm

Magnification	20	30	40	50	100	150	200	220
Working Distance	60.2	33.5	20.9	13.9	4.1	5.6	9.9	11.9
Field of View	19.5 x 15.6	13 x 10.4	9.8 x 7.8	7.8 x 6.3	3.9 x 3.1	2.6 x 2.1	2 x 1.6	1.8 x 1.4
Depth of Field	2.5	1.8	1.5					0.1

Working distance & field of view inch

Magnification	20	30	40	50	100	150	200	220
Working Distance	2.370	1.319	0.823	0.547	0.161	0.220	0.390	0.469
Field of View	0.768 x 0.614	0.512 x 0.409	0.386 x 0.307	0.307 x 0.248	0.154 x 0.122	0.102 x 0.083	0.079 x 0.063	0.071 x 0.055
Depth of Field	0.098	0.071	0.059					0.004

Specifications

LEDs	Infrared (8)	Connection Type	USB 2.0
Polarization	No	Included Software	DinoCapture 2.0 (Windows), DinoScope (Mac OS)
LED Spectrum	850nm	Imaging Standards	UVC
Dimensions	10.5cm (L) x 3.2cm (D) (4.13" x 1.26")	Flexible LED Control	No
Weight	105g (3.7 oz)	Measurement	Yes
Cable Length	182cm (71.65 in)	Automatic Magnification Reading	No
Magnification Range	10x - 220x	Extended Depth of Field	No
Working Distance	Standard	Enhanced Dynamic Range	No
Lens Type	Glass	Magnification Lock	Yes
Megapixels	1.3 MP	Body Material	ABS Plastic
Sensor Type	CMOS	Microtouch Sensor	Yes
Resolution	1280 x 1024 pixels	Package Includes	Microscope, Carry Pouch, Software CD, Edge Calibration Target, Alternate end caps
Frame Rate (max)	30 FPS	Warranty Period	2 years
Image Save Formats (Windows)	BMP, GIF, PNG, JPG, TIF, RAS, PNM, TGA, PCX, MNG, WBMP, JP2, JPC, PGX	Manufactured in	Taiwan
Image Save Formats (Mac OS)	JPEG, PNG	Service & Support	U.S. (www.dinolite.us) English & Spanish
Video Save Formats (Windows)	WMV, FLV, SWF	Regulatory Approval	CE, FCC
Video Save Formats (Mac OS)	MOV		