



**FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY  
FIRE SAFETY RESEARCH CENTER**



- TYPE OF TEST** : DETERMINATION OF THE FIRE RESISTANCE OF PROTECTION FOR STRUCTURAL STEEL SECTIONS
- TEST SPECIMEN** : NEOCOAT INTUMESCENT PAINT-S  
The specimens consist of four structural steel sections, H 200x200x8x12 mm, with the  $H_p/A$  values as shown in the table below. The Neocoat Intumescent Paint-S was applied to the specimens with the coating thicknesses as shown in Appendix C. The length of the specimens was approximately 1.00 m. The fire protection material was applied to the outside surface of the specimens. The fire protection of the specimens was provided and installed by the client.
- CLIENT** : **UNIQUE PRODUCTS (THAILAND) CO., LTD.**  
104/34-35 Moo 12, Soi Tanasit, Bangpla, Bangplee  
Samutprakarn 10540, Thailand  
Tel: (662) 174-6176-80 Fax: (662) 174-6181
- DATE OF TEST** : September 29, 2008
- TEST MACHINE** : Medium-scale horizontal furnace (Fire Tester II) at the Fire Safety Research Center, Department of Civil Engineering, Chulalongkorn University. The furnace is capable of producing a standard temperature-time relationship according to several fire resistance standards including ASTM E119-07a.
- TEST METHOD** : The testing procedures follow ASTM E119-07a Standard Test Methods for Fire Tests of Building Construction and Materials: Alternative Test of Protection for Structural Steel Columns. The specimens were exposed to fire on the outside surface. Failure is deemed to occur when the maximum temperature at any point on the specimen exceeds 649°C or the average temperature of the specimen at any section exceeds 538°C.
- TEST RESULTS** : The specimens described above have the fire resistance of fire protection coating for the structural steel sections as shown in the following table. The details of the test results and photographs are shown in Appendix B and Appendix D.  
(The test results are good only for the specimens tested.)

| Specimen | Section           | Model   | Average Thickness (μm) | $H_p/A$ (m <sup>-1</sup> ) | Fire Resistance (hr:min) | Remarks                                                                       |
|----------|-------------------|---------|------------------------|----------------------------|--------------------------|-------------------------------------------------------------------------------|
| 1        | H 200x200x8x12 mm | Neocoat | 514                    | 191                        | 0:48                     | Failure occurred when the maximum temperature of the specimen exceeded 649°C. |
| 2        | H 200x200x8x12 mm | Neocoat | 820                    | 191                        | 0:59                     | Failure occurred when the maximum temperature of the specimen exceeded 649°C. |
| 3        | H 200x200x8x12 mm | Neocoat | 1093                   | 191                        | 0:56                     | Failure occurred when the maximum temperature of the specimen exceeded 649°C. |
| 4        | H 200x200x8x12 mm | Neocoat | 1186                   | 191                        | 1:04                     | Failure occurred when the maximum temperature of the specimen exceeded 649°C. |

Tested by:

(Assistant Prof. Dr. Watanachai Smiltakorn)

(Associate Prof. Dr. Chadchart Sittipunt)

Date: October 10, 2008

(Associate Prof. Dr. Thanyawat Pothisiri)

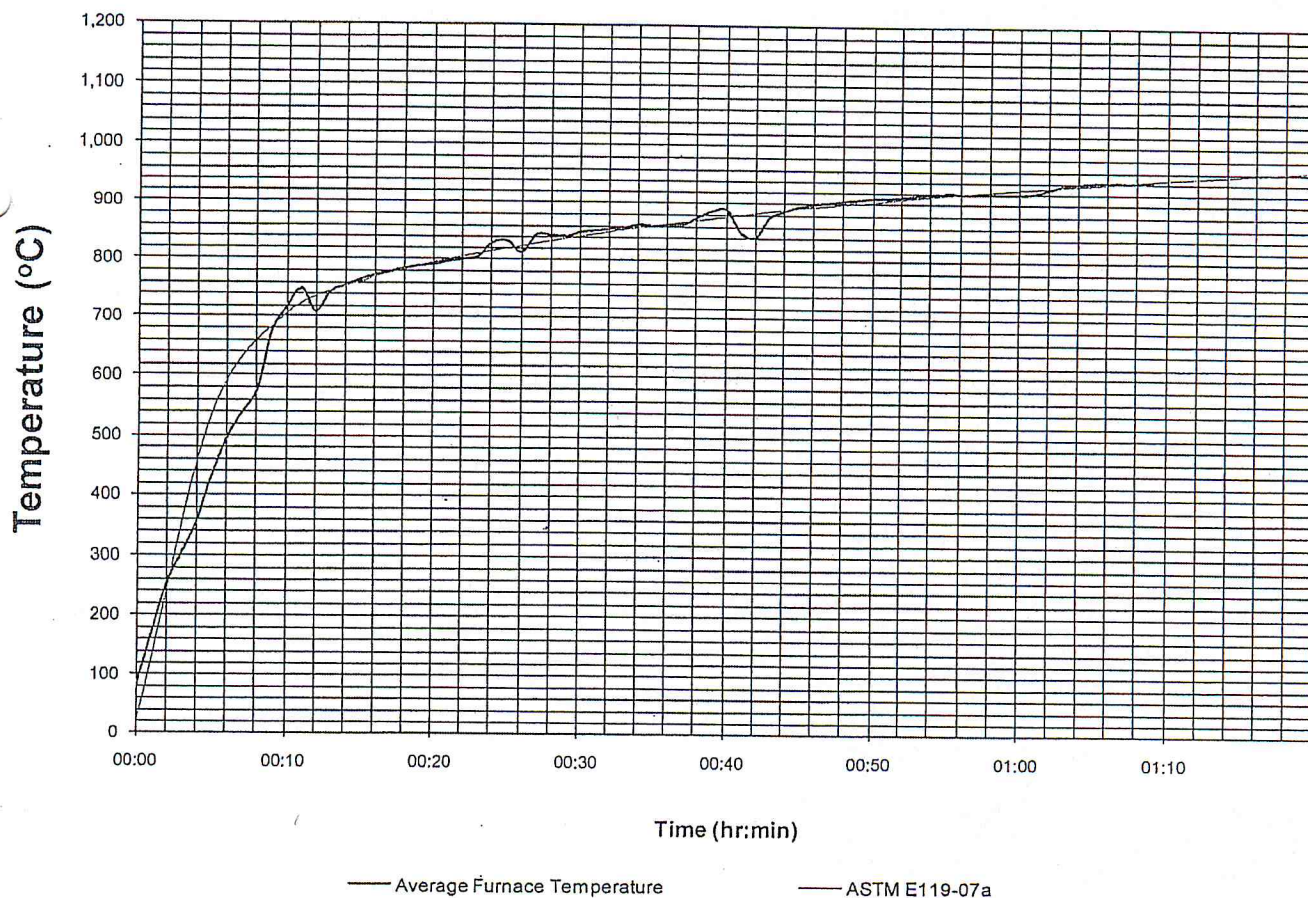
(Assistant Prof. Dr. Chatpan Chintanapakdee)  
On Behalf of Head of Civil Engineering Department



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY  
FIRE SAFETY RESEARCH CENTER



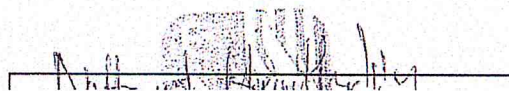
## FURNACE TEMPERATURE

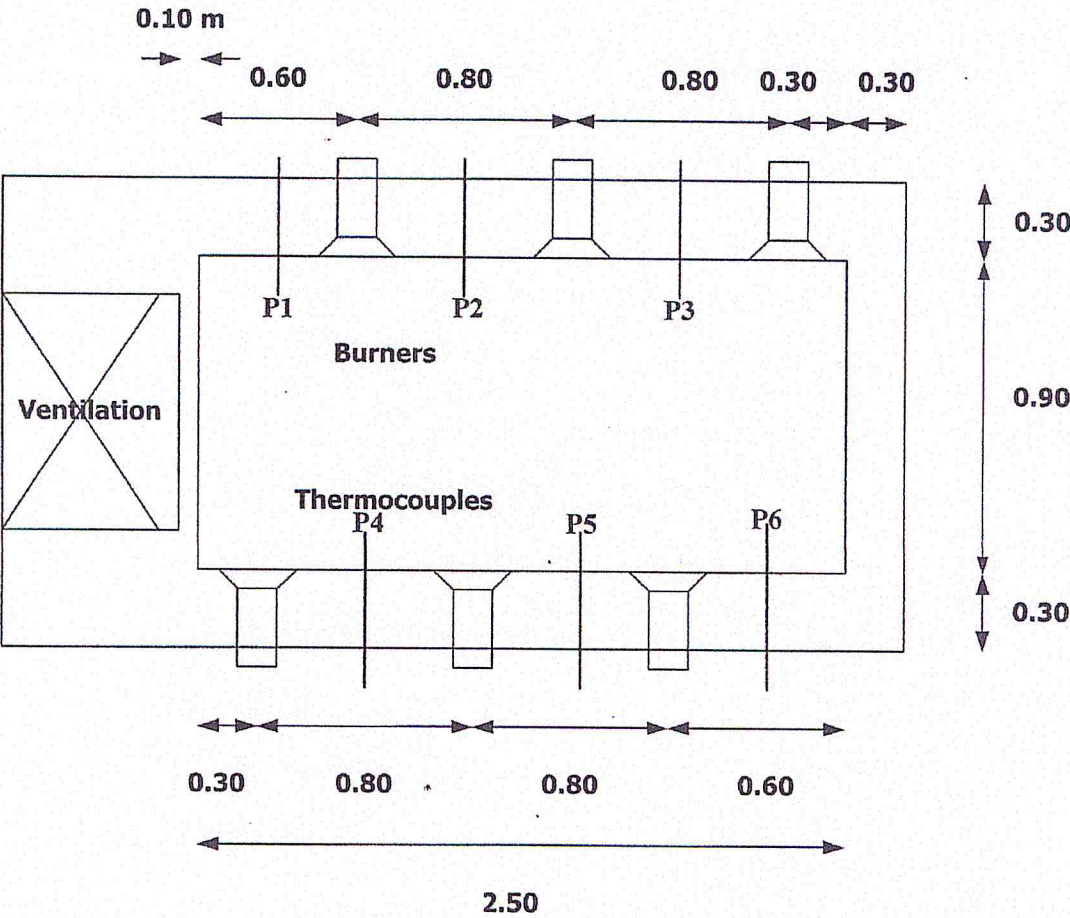


Nithasat Uebolubun

| Time<br>(hr:min:sec) | Furnace Temperature (°C) |     |     |     |     |     |         | Time<br>(hr:min:sec) | ASTM E119-07a<br>(°C) |
|----------------------|--------------------------|-----|-----|-----|-----|-----|---------|----------------------|-----------------------|
|                      | P1                       | P2  | P3  | P4  | P5  | P6  | Average |                      |                       |
| 0:00:00              | 73                       | 46  | 67  | 95  | 146 | 38  | 77      | 0:00                 | 20                    |
| 0:01:00              | 192                      | 82  | 169 | 210 | 303 | 48  | 167     | 0:05                 | 538                   |
| 0:02:00              | 293                      | 141 | 294 | 288 | 407 | 78  | 250     | 0:10                 | 704                   |
| 0:03:00              | 350                      | 187 | 373 | 338 | 447 | 120 | 302     | 0:15                 | 780                   |
| 0:04:00              | 399                      | 237 | 427 | 384 | 495 | 166 | 351     | 0:20                 | 795                   |
| 0:05:00              | 441                      | 349 | 493 | 521 | 527 | 233 | 427     | 0:25                 | 821                   |
| 0:06:00              | 489                      | 463 | 557 | 606 | 541 | 299 | 492     | 0:30                 | 843                   |
| 0:07:00              | 517                      | 531 | 597 | 643 | 589 | 361 | 540     | 0:35                 | 862                   |
| 0:08:00              | 546                      | 580 | 623 | 678 | 618 | 410 | 576     | 0:40                 | 878                   |
| 0:09:00              | 684                      | 714 | 699 | 769 | 691 | 491 | 675     | 0:45                 | 892                   |
| 0:10:00              | 719                      | 764 | 736 | 806 | 728 | 551 | 717     | 0:50                 | 905                   |
| 0:11:00              | 752                      | 787 | 764 | 825 | 763 | 598 | 748     | 0:55                 | 918                   |
| 0:12:00              | 673                      | 734 | 732 | 781 | 735 | 603 | 710     | 1:00                 | 927                   |
| 0:13:00              | 739                      | 755 | 768 | 812 | 762 | 623 | 743     | 1:05                 | 937                   |
| 0:14:00              | 742                      | 769 | 779 | 822 | 772 | 642 | 754     | 1:10                 | 946                   |
| 0:15:00              | 745                      | 782 | 788 | 833 | 783 | 657 | 765     |                      |                       |
| 0:16:00              | 758                      | 787 | 796 | 836 | 791 | 672 | 773     |                      |                       |
| 0:17:00              | 739                      | 794 | 803 | 845 | 804 | 682 | 778     |                      |                       |
| 0:18:00              | 756                      | 797 | 808 | 847 | 810 | 690 | 785     |                      |                       |
| 0:19:00              | 758                      | 799 | 814 | 850 | 815 | 698 | 789     |                      |                       |
| 0:20:00              | 765                      | 801 | 817 | 853 | 818 | 705 | 793     |                      |                       |
| 0:21:00              | 771                      | 806 | 821 | 858 | 825 | 711 | 798     |                      |                       |
| 0:22:00              | 777                      | 807 | 824 | 858 | 824 | 717 | 801     |                      |                       |
| 0:23:00              | 772                      | 810 | 830 | 865 | 832 | 722 | 805     |                      |                       |
| 0:24:00              | 818                      | 830 | 859 | 882 | 851 | 736 | 829     |                      |                       |
| 0:25:00              | 824                      | 831 | 855 | 880 | 851 | 750 | 832     |                      |                       |
| 0:26:00              | 788                      | 812 | 834 | 861 | 835 | 745 | 813     |                      |                       |
| 0:27:00              | 831                      | 842 | 871 | 894 | 865 | 756 | 843     |                      |                       |
| 0:28:00              | 834                      | 840 | 865 | 888 | 861 | 767 | 843     |                      |                       |
| 0:29:00              | 817                      | 840 | 867 | 888 | 866 | 769 | 841     |                      |                       |
| 0:30:00              | 850                      | 840 | 871 | 887 | 865 | 775 | 848     |                      |                       |
| 0:31:00              | 857                      | 842 | 875 | 889 | 869 | 779 | 852     |                      |                       |
| 0:32:00              | 858                      | 844 | 882 | 892 | 871 | 782 | 855     |                      |                       |
| 0:33:00              | 859                      | 847 | 883 | 894 | 874 | 786 | 857     |                      |                       |
| 0:34:00              | 870                      | 850 | 885 | 898 | 881 | 792 | 862     |                      |                       |
| 0:35:00              | 846                      | 852 | 886 | 901 | 882 | 792 | 860     |                      |                       |
| 0:36:00              | 848                      | 853 | 889 | 901 | 884 | 796 | 862     |                      |                       |
| 0:37:00              | 849                      | 856 | 888 | 903 | 885 | 798 | 863     |                      |                       |
| 0:38:00              | 869                      | 865 | 901 | 913 | 894 | 803 | 874     |                      |                       |
| 0:39:00              | 885                      | 876 | 912 | 921 | 904 | 814 | 885     |                      |                       |
| 0:40:00              | 884                      | 880 | 915 | 926 | 909 | 820 | 889     |                      |                       |
| 0:41:00              | 834                      | 839 | 874 | 881 | 871 | 801 | 850     |                      |                       |
| 0:42:00              | 826                      | 828 | 867 | 873 | 862 | 788 | 841     |                      |                       |
| 0:43:00              | 865                      | 866 | 905 | 914 | 894 | 803 | 875     |                      |                       |
| 0:44:00              | 881                      | 879 | 916 | 925 | 906 | 816 | 887     |                      |                       |
| 0:45:00              | 890                      | 885 | 921 | 931 | 913 | 825 | 894     |                      |                       |
| 0:46:00              | 896                      | 890 | 924 | 934 | 917 | 834 | 899     |                      |                       |
| 0:47:00              |                          |     |     |     |     |     |         |                      |                       |

| Time<br>(hr:min:sec) | Furnace Temperature( <sup>0</sup> C) |     |     |     |     |     | Average |
|----------------------|--------------------------------------|-----|-----|-----|-----|-----|---------|
|                      | P1                                   | P2  | P3  | P4  | P5  | P6  |         |
| 1:00:00              | 904                                  | 913 | 945 | 961 | 934 | 862 | 920     |
| 1:01:00              | 905                                  | 915 | 947 | 966 | 935 | 864 | 922     |
| 1:02:00              | 916                                  | 921 | 955 | 973 | 943 | 868 | 929     |
| 1:03:00              | 925                                  | 928 | 960 | 976 | 949 | 875 | 935     |
| 1:04:00              | 924                                  | 931 | 963 | 977 | 951 | 878 | 937     |
| 1:05:00              | 928                                  | 933 | 965 | 979 | 954 | 881 | 940     |
| 1:06:00              | 927                                  | 933 | 964 | 978 | 955 | 883 | 940     |
| 1:07:00              | 928                                  | 935 | 965 | 980 | 954 | 885 | 941     |
| 1:08:00              | 931                                  | 935 | 965 | 980 | 953 | 886 | 942     |
| 1:09:00              | 935                                  | 930 | 967 | 980 | 955 | 888 | 942     |

A handwritten signature is written over a rectangular stamp. The stamp contains some illegible text and a circular emblem.



Unit in meters

Figure A-1: Details of the furnace

*[Handwritten signature]*

## APPENDIX B: TEMPERATURE OF THE SPECIMEN

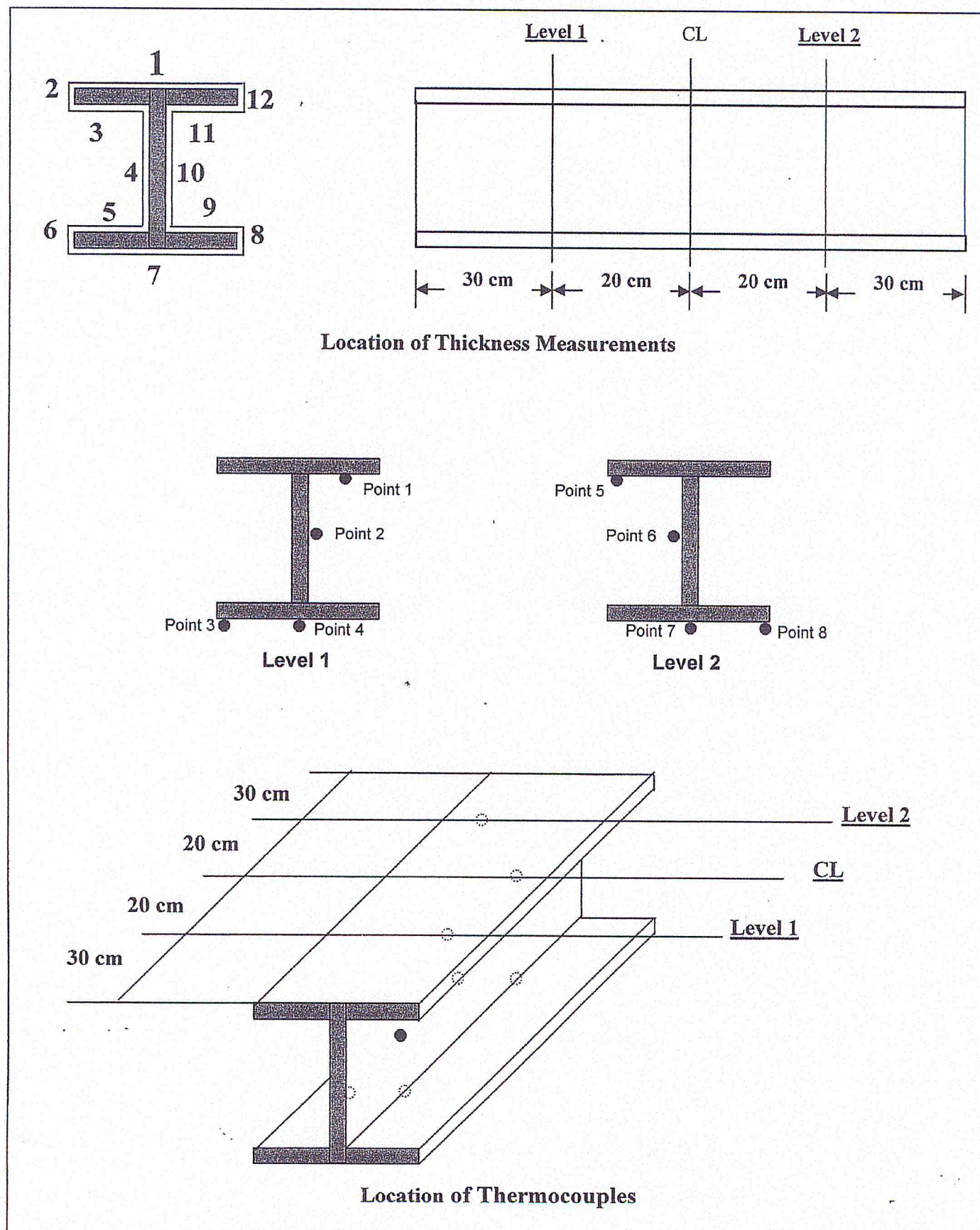


Figure B-1: Location of thermocouples and thickness measurements on the specimen

Signature: *[Handwritten Signature]*

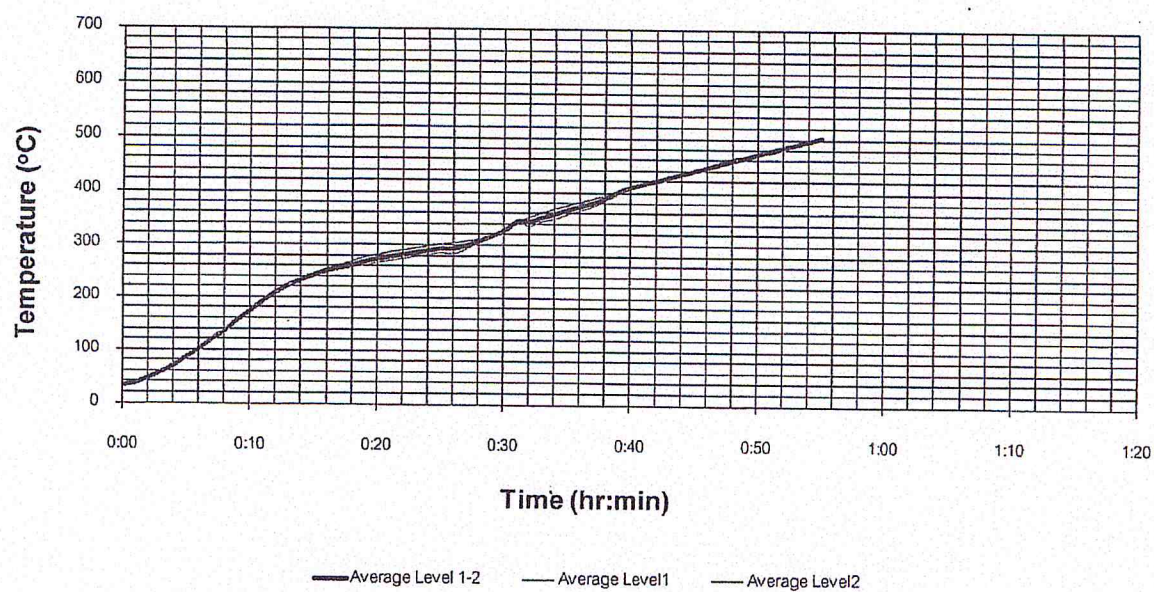
Date: *[Handwritten Date]*

CLIENT : UNIQUE PRODUCTS (THAILAND) CO., LTD.  
 TESTED SPECIMENS : Neocoat Intumescent Paint-S Specimen No.1  
 DATE OF TEST : September 29, 2008

| Time<br>(hr:min:sec) | Specimen No.1 Temperature (°C) |         |         |         |                   |         |         |         |         |                   |                      |
|----------------------|--------------------------------|---------|---------|---------|-------------------|---------|---------|---------|---------|-------------------|----------------------|
|                      | Level1                         |         |         |         |                   | Level2  |         |         |         |                   | Average<br>Level 1-2 |
|                      | Point 1                        | Point 2 | Point 3 | Point 4 | Average<br>Level1 | Point 5 | Point 6 | Point 7 | Point 8 | Average<br>Level2 |                      |
| 00:00                | 34                             | 34      | 33      | 34      | 34                | 34      | 34      | 35      | -       | 34                | 34                   |
| 00:01                | 39                             | 39      | 36      | 37      | 38                | 37      | 37      | 42      | -       | 39                | 38                   |
| 00:02                | 47                             | 53      | 43      | 46      | 47                | 44      | 45      | 57      | -       | 49                | 48                   |
| 00:03                | 56                             | 68      | 52      | 58      | 58                | 52      | 54      | 73      | -       | 60                | 59                   |
| 00:04                | 65                             | 85      | 62      | 72      | 71                | 60      | 64      | 89      | -       | 71                | 71                   |
| 00:05                | 77                             | 106     | 78      | 91      | 88                | 70      | 78      | 110     | -       | 86                | 87                   |
| 00:06                | 90                             | 123     | 92      | 109     | 103               | 81      | 92      | 131     | -       | 101               | 102                  |
| 00:07                | 103                            | 143     | 111     | 130     | 122               | 95      | 110     | 154     | -       | 119               | 121                  |
| 00:08                | 115                            | 162     | 129     | 150     | 139               | 108     | 126     | 172     | -       | 135               | 137                  |
| 00:09                | 130                            | 182     | 152     | 175     | 160               | 126     | 145     | 194     | -       | 155               | 157                  |
| 00:10                | 143                            | 200     | 173     | 192     | 177               | 144     | 164     | 211     | -       | 173               | 175                  |
| 00:11                | 158                            | 218     | 195     | 210     | 195               | 165     | 185     | 230     | -       | 193               | 194                  |
| 00:12                | 170                            | 230     | 213     | 224     | 209               | 182     | 204     | 246     | -       | 210               | 210                  |
| 00:13                | 186                            | 240     | 225     | 236     | 222               | 199     | 217     | 259     | -       | 225               | 223                  |
| 00:14                | 198                            | 247     | 234     | 245     | 231               | 212     | 227     | 270     | -       | 237               | 234                  |
| 00:15                | 209                            | 254     | 242     | 253     | 239               | 225     | 235     | 280     | -       | 246               | 243                  |
| 00:16                | 216                            | 260     | 248     | 260     | 246               | 236     | 240     | 288     | -       | 255               | 250                  |
| 00:17                | 222                            | 265     | 255     | 265     | 252               | 245     | 247     | 293     | -       | 262               | 257                  |
| 00:18                | 225                            | 270     | 262     | 271     | 257               | 253     | 256     | 299     | -       | 269               | 263                  |
| 00:19                | 229                            | 274     | 267     | 276     | 261               | 260     | 266     | 304     | -       | 276               | 269                  |
| 00:20                | 235                            | 278     | 271     | 280     | 266               | 266     | 270     | 309     | -       | 281               | 274                  |
| 00:21                | 239                            | 282     | 275     | 285     | 270               | 271     | 274     | 313     | -       | 286               | 278                  |
| 00:22                | 241                            | 285     | 280     | 290     | 274               | 276     | 277     | 317     | -       | 290               | 282                  |
| 00:23                | 243                            | 288     | 285     | 294     | 277               | 280     | 281     | 321     | -       | 294               | 286                  |
| 00:24                | 245                            | 291     | 289     | 298     | 281               | 284     | 284     | 325     | -       | 298               | 289                  |
| 00:25                | 248                            | 294     | 294     | 303     | 285               | 287     | 287     | 329     | -       | 301               | 293                  |
| 00:26                | 247                            | 296     | 302     | 285     | 283               | 291     | 290     | 332     | -       | 304               | 293                  |
| 00:27                | 253                            | 299     | 309     | 304     | 291               | 294     | 293     | 336     | -       | 308               | 299                  |
| 00:28                | 259                            | 301     | 327     | 328     | 304               | 297     | 296     | 342     | -       | 312               | 308                  |
| 00:29                | 267                            | 304     | 369     | 340     | 320               | 300     | 298     | 348     | -       | 315               | 318                  |
| 00:30                | 268                            | 306     | 379     | 351     | 326               | 302     | 301     | 381     | -       | 328               | 327                  |
| 00:31                | -                              | 309     | 386     | 340     | 345               | 305     | 304     | 423     | -       | 344               | 345                  |
| 00:32                | 274                            | 314     | 388     | 368     | 336               | 308     | 307     | 447     | -       | 354               | 345                  |
| 00:33                | 277                            | 320     | 388     | 393     | 344               | 310     | 310     | 465     | -       | 362               | 353                  |
| 00:34                | 281                            | 319     | 394     | 406     | 350               | 313     | 314     | 481     | -       | 369               | 359                  |
| 00:35                | 288                            | 323     | 405     | 419     | 359               | 315     | 318     | 494     | -       | 376               | 367                  |
| 00:36                | 289                            | 327     | 416     | 431     | 366               | 318     | 322     | 506     | -       | 382               | 374                  |
| 00:37                | 290                            | 331     | 429     | 442     | 373               | 321     | 326     | 517     | -       | 388               | 380                  |
| 00:38                | 291                            | 336     | 453     | 453     | 383               | 324     | 331     | 529     | -       | 395               | 389                  |
| 00:39                | 293                            | 340     | 501     | 466     | 400               | 327     | 337     | 542     | -       | 402               | 401                  |
| 00:40                | 295                            | 346     | 527     | 478     | 412               | 330     | 342     | 555     | -       | 409               | 410                  |
| 00:41                | 297                            | 352     | 540     | 488     | 419               | 333     | 347     | 561     | -       | 414               | 416                  |
| 00:42                | 299                            | 358     | 545     | 497     | 425               | 336     | 353     | 568     | -       | 419               | 422                  |
| 00:43                | 302                            | 363     | 553     | 506     | 431               | 338     | 358     | 580     | -       | 425               | 428                  |
| 00:44                | 305                            | 369     | 561     | 516     | 437               | 341     | 363     | 592     | -       | 432               | 435                  |
| 00:45                | 307                            | 375     | 567     | 526     | 444               | 344     | 368     | 603     | -       | 438               | 441                  |
| 00:46                | 309                            | 381     | 574     | 535     | 450               | 346     | 374     | 613     | -       | 444               | 447                  |
| 00:47                | 312                            | 387     | 581     | 545     | 456               | 348     | 379     | 628     | -       | 452               | 454                  |
| 00:48                | 315                            | 393     | 589     | 554     | 463               | 351     | 384     | 643     | -       | 459               | 461                  |
| 00:49                | 317                            | 399     | 597     | 548     | 465               | 354     | 390     |         | -       | 465               | 465                  |
| 00:50                | 321                            | 405     | 605     | 563     | 474               | 357     | 396     | 660     | -       | 471               | 472                  |
| 00:51                | 325                            | 412     | 612     | 573     | 480               | 360     | 402     | 667     | -       | 477               | 479                  |
| 00:52                | 328                            | 419     | 619     | 584     | 487               | 364     | 409     | 674     | -       | 482               | 485                  |
| 00:53                | 331                            | 425     | 623     | 596     | 494               | 367     | 416     | 680     | -       | 488               | 491                  |
| 00:54                | 334                            | 432     | 627     | 606     | 500               | 371     | 423     | 687     | -       | 494               | 497                  |
| 00:55                | 337                            | 440     | 631     | 615     | 506               | 375     | 430     | 693     | -       | 499               | 502                  |

*[Handwritten signature]*

## SPECIMEN No.1 TEMPERATURE



Signature

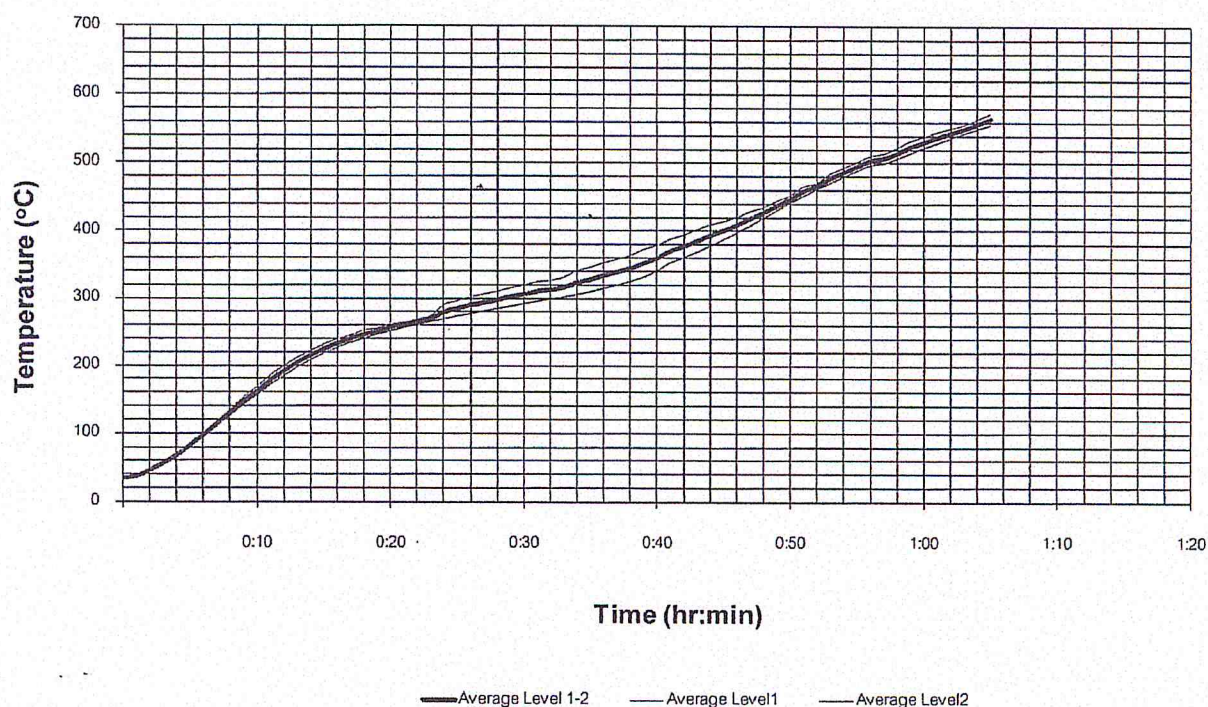
CLIENT : UNIQUE PRODUCTS (THAILAND) CO., LTD.  
 TESTED SPECIMENS : Neocoat Intumescent Paint-S Specimen No.2  
 DATE OF TEST : September 29, 2008

| Time<br>(hr:min:sec) | Specimen No.2 Temperature (°C) |         |         |         |                   |         |         |         |         |                   |                      |
|----------------------|--------------------------------|---------|---------|---------|-------------------|---------|---------|---------|---------|-------------------|----------------------|
|                      | Level1                         |         |         |         |                   | Level2  |         |         |         |                   | Average<br>Level 1-2 |
|                      | Point 1                        | Point 2 | Point 3 | Point 4 | Average<br>Level1 | Point 5 | Point 6 | Point 7 | Point 8 | Average<br>Level2 |                      |
| 00:00                | 34                             | 35      | 33      | 33      | 34                | 33      | 35      | 34      | 34      | 34                | 34                   |
| 00:01                | 37                             | 40      | 35      | 36      | 37                | 35      | 40      | 37      | 36      | 37                | 37                   |
| 00:02                | 46                             | 53      | 42      | 45      | 46                | 41      | 51      | 45      | 44      | 45                | 46                   |
| 00:03                | 56                             | 68      | 51      | 56      | 58                | 49      | 63      | 55      | 53      | 55                | 56                   |
| 00:04                | 66                             | 83      | 62      | 68      | 70                | 57      | 76      | 66      | 64      | 66                | 68                   |
| 00:05                | 80                             | 102     | 78      | 84      | 86                | 69      | 92      | 82      | 79      | 80                | 83                   |
| 00:06                | 93                             | 119     | 93      | 100     | 101               | 81      | 106     | 97      | 93      | 94                | 98                   |
| 00:07                | 108                            | 139     | 110     | 117     | 118               | 95      | 122     | 113     | 110     | 110               | 114                  |
| 00:08                | 122                            | 157     | 127     | 133     | 135               | 107     | 137     | 128     | 126     | 125               | 130                  |
| 00:09                | 138                            | 178     | 145     | 150     | 153               | 121     | 152     | 144     | 146     | 140               | 147                  |
| 00:10                | 153                            | 197     | 161     | 165     | 169               | 133     | 167     | 158     | 162     | 155               | 162                  |
| 00:11                | 170                            | 214     | 178     | 182     | 186               | 146     | 184     | 173     | 179     | 170               | 178                  |
| 00:12                | 184                            | 225     | 195     | 196     | 200               | 158     | 198     | 186     | 192     | 183               | 192                  |
| 00:13                | 198                            | 234     | 209     | 209     | 212               | 172     | 212     | 198     | 204     | 197               | 204                  |
| 00:14                | 210                            | 240     | 223     | 220     | 223               | 185     | 222     | 209     | 214     | 207               | 215                  |
| 00:15                | 222                            | 246     | 233     | 229     | 232               | 197     | 230     | 219     | 224     | 218               | 225                  |
| 00:16                | 233                            | 251     | 241     | 236     | 240               | 208     | 237     | 227     | 233     | 226               | 233                  |
| 00:17                | 241                            | 256     | 244     | 243     | 246               | 218     | 242     | 234     | 240     | 233               | 240                  |
| 00:18                | 247                            | 260     | 256     | 249     | 253               | 227     | 247     | 240     | 246     | 240               | 246                  |
| 00:19                | 253                            | 265     | 253     | 254     | 256               | 234     | 252     | 245     | 251     | 246               | 251                  |
| 00:20                | 258                            | 269     | 263     | 260     | 263               | 241     | 256     | 250     | 257     | 251               | 257                  |
| 00:21                | 263                            | 272     | 259     | 265     | 265               | 247     | 259     | 255     | 262     | 256               | 260                  |
| 00:22                | 267                            | 276     | 266     | 270     | 270               | 253     | 263     | 259     | 267     | 260               | 265                  |
| 00:23                | 271                            | 283     | 269     | 274     | 275               | 258     | 267     | 264     | 271     | 265               | 270                  |
| 00:24                | 276                            | 332     | 276     | 280     | 291               | 262     | 270     | 268     | 276     | 269               | 280                  |
| 00:25                | 279                            | 341     | 283     | 284     | 297               | 266     | 273     | 273     | 281     | 273               | 285                  |
| 00:26                | 283                            | 346     | 290     | 290     | 302               | 270     | 276     | 276     | 285     | 277               | 290                  |
| 00:27                | 287                            | 350     | 294     | 295     | 306               | 273     | 279     | 281     | 290     | 280               | 293                  |
| 00:28                | 290                            | 354     | 300     | 300     | 311               | 276     | 282     | 285     | 294     | 284               | 298                  |
| 00:29                | 293                            | 356     | 308     | 306     | 316               | 279     | 285     | 289     | 298     | 288               | 302                  |
| 00:30                | 296                            | 356     | 315     | 312     | 320               | 282     | 287     | 294     | 303     | 291               | 306                  |
| 00:31                | 299                            | 360     | 323     | 318     | 325               | 285     | 289     | 298     | 306     | 295               | 310                  |
| 00:32                | 302                            | 362     | 319     | 324     | 327               | 288     | 292     | 301     | 311     | 298               | 312                  |
| 00:33                | 305                            | 365     | 326     | 332     | 332               | 290     | 294     | 305     | 315     | 301               | 316                  |
| 00:34                | 307                            | 367     | 351     | 341     | 342               | 293     | 296     | 310     | 321     | 305               | 323                  |
| 00:35                | 310                            | 367     | 359     | 351     | 347               | 296     | 298     | 316     | 327     | 309               | 328                  |
| 00:36                | 312                            | 371     | 367     | 364     | 354               | 300     | 300     | 325     | 333     | 314               | 334                  |
| 00:37                | 315                            | 375     | 372     | 376     | 359               | 303     | 302     | 330     | 341     | 319               | 339                  |
| 00:38                | 317                            | 377     | 376     | 388     | 364               | 306     | 305     | 340     | 349     | 325               | 345                  |
| 00:39                | 320                            | 382     | 392     | 401     | 374               | 308     | 307     | 352     | 358     | 331               | 352                  |
| 00:40                | 322                            | 386     | 397     | 414     | 380               | 311     | 310     | 371     | 369     | 340               | 360                  |
| 00:41                | 325                            | 387     | 419     | 424     | 389               | 313     | 314     | 403     | 381     | 352               | 370                  |
| 00:42                | 327                            | 389     | 429     | 435     | 395               | 314     | 317     | 415     | 394     | 360               | 377                  |
| 00:43                | 329                            | 390     | 442     | 450     | 403               | 316     | 321     | 430     | 406     | 368               | 385                  |
| 00:44                | 330                            | 389     | 453     | 466     | 410               | 318     | 325     | 446     | 421     | 377               | 393                  |
| 00:45                | 332                            | 380     | 467     | 479     | 415               | 319     | 329     | 461     | 437     | 386               | 401                  |
| 00:46                | 334                            | 379     | 477     | 492     | 420               | 322     | 333     | 478     | 453     | 397               | 408                  |
| 00:47                | 336                            | 384     | 493     | 504     | 429               | 324     | 339     | 495     | 470     | 407               | 418                  |
| 00:48                | 338                            | 390     | 498     | 516     | 435               | 326     | 344     | 517     | 487     | 418               | 427                  |
| 00:49                | 340                            | 398     | 513     | 526     | 444               | 328     | 350     | 537     | 504     | 430               | 437                  |
| 00:50                | 342                            | 410     | 522     | 537     | 453               | 329     | 356     | 557     | 519     | 440               | 446                  |

*[Handwritten signature]*

| Time<br>(hr:min:sec) | Specimen No.2 Temperature (°C) |         |         |         |                   |         |         |         |         |                   |                      |
|----------------------|--------------------------------|---------|---------|---------|-------------------|---------|---------|---------|---------|-------------------|----------------------|
|                      | Level1                         |         |         |         |                   | Level2  |         |         |         |                   | Average<br>Level 1-2 |
|                      | Point 1                        | Point 2 | Point 3 | Point 4 | Average<br>Level1 | Point 5 | Point 6 | Point 7 | Point 8 | Average<br>Level2 |                      |
| 00:51                | 345                            | 420     | 548     | 550     | 466               | 331     | 362     | 574     | 535     | 451               | 458                  |
| 00:52                | 348                            | 429     | 547     | 562     | 471               | 333     | 369     | 590     | 551     | 461               | 466                  |
| 00:53                | 350                            | 439     | 575     | 575     | 485               | 335     | 375     | 605     | 565     | 470               | 477                  |
| 00:54                | 353                            | 448     | 585     | 587     | 493               | 337     | 382     | 619     | 579     | 479               | 486                  |
| 00:55                | 356                            | 457     | 594     | 599     | 501               | 339     | 389     | 631     | 593     | 488               | 495                  |
| 00:56                | 358                            | 467     | 606     | 610     | 510               | 341     | 397     | 641     | 605     | 496               | 503                  |
| 00:57                | 362                            | 475     | 600     | 620     | 514               | 343     | 404     | 631     | 616     | 499               | 506                  |
| 00:58                | 365                            | 481     | 611     | 630     | 522               | 345     | 412     | 638     | 628     | 506               | 514                  |
| 00:59                | 369                            | 490     | 629     | 641     | 532               | 348     | 419     | 648     | 638     | 513               | 523                  |
| 01:00                | 373                            | 496     | 635     | 651     | 539               | 351     | 427     | 659     | 648     | 521               | 530                  |
| 01:01                | 377                            | 503     | 641     | 661     | 545               | 354     | 434     | 669     | 657     | 528               | 537                  |
| 01:02                | 381                            | 508     | 644     | 670     | 551               | 357     | 440     | 679     | 666     | 535               | 543                  |
| 01:03                | 386                            | 508     | 652     | 679     | 556               | 360     | 447     | 688     | 675     | 542               | 549                  |
| 01:04                | 391                            | 517     | 662     | 688     | 565               | 363     | 454     | 696     | 683     | 549               | 557                  |
| 01:05                | 395                            | 527     | 671     | 697     | 573               | 366     | 460     | 703     | 692     | 555               | 564                  |

## SPECIMEN No.2 TEMPERATURE



Handwritten signature and date: 11/11/2011

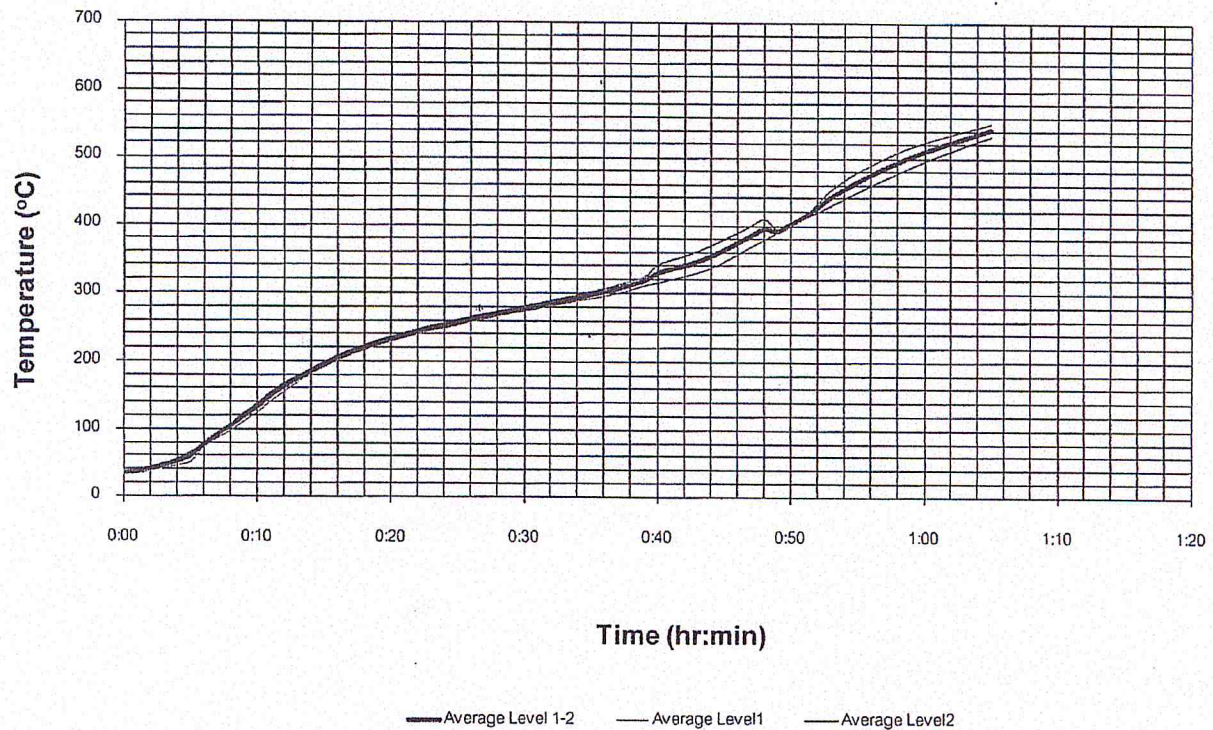
CLIENT : UNIQUE PRODUCTS (THAILAND) CO., LTD.  
 TESTED SPECIMENS : Neocoat Intumescent Paint-S Specimen No.3  
 DATE OF TEST : September 29, 2008

| Time<br>(hr:min:sec) | Specimen No.3 Temperature (°C) |         |         |         |                   |         |         |         |         |                   |                      |
|----------------------|--------------------------------|---------|---------|---------|-------------------|---------|---------|---------|---------|-------------------|----------------------|
|                      | Level1                         |         |         |         |                   | Level2  |         |         |         |                   | Average<br>Level 1-2 |
|                      | Point 1                        | Point 2 | Point 3 | Point 4 | Average<br>Level1 | Point 5 | Point 6 | Point 7 | Point 8 | Average<br>Level2 |                      |
| 00:00                | 33                             | 33      | 33      | 32      | 33                | 33      | 33      | 33      | 33      | 33                | 33                   |
| 00:01                | 36                             | 33      | 35      | 33      | 34                | 35      | 35      | 36      | 35      | 35                | 35                   |
| 00:02                | 40                             | 35      | 41      | 33      | 37                | -       | 41      | 42      | 41      | 41                | 39                   |
| 00:03                | 45                             | 37      | 49      | 35      | 41                | -       | 47      | 49      | 48      | 48                | 45                   |
| 00:04                | 50                             | 38      | 57      | 36      | 45                | -       | 54      | 57      | 56      | 56                | 51                   |
| 00:05                | 57                             | 41      | 67      | 38      | 51                | -       | 62      | 68      | 67      | 66                | 58                   |
| 00:06                | 66                             | -       | 80      | -       | 73                | -       | 72      | 82      | 81      | 78                | 76                   |
| 00:07                | 77                             | -       | 94      | -       | 86                | -       | 85      | 99      | 98      | 94                | 90                   |
| 00:08                | 88                             | -       | 107     | -       | 98                | -       | 97      | 115     | 113     | 108               | 103                  |
| 00:09                | 102                            | -       | 121     | -       | 111               | -       | 113     | 131     | 128     | 124               | 118                  |
| 00:10                | 116                            | -       | 134     | -       | 125               | -       | 129     | 146     | 142     | 139               | 132                  |
| 00:11                | 133                            | -       | 150     | -       | 141               | -       | 147     | 161     | 156     | 155               | 148                  |
| 00:12                | 149                            | -       | 162     | -       | 155               | -       | 163     | 173     | 169     | 168               | 162                  |
| 00:13                | 164                            | -       | 175     | -       | 169               | 168     | 177     | 186     | 182     | 178               | 174                  |
| 00:14                | 177                            | -       | 185     | -       | 181               | 177     | 188     | 196     | 193     | 189               | 185                  |
| 00:15                | 189                            | -       | 194     | -       | 192               | 186     | 198     | 207     | 204     | 199               | 195                  |
| 00:16                | 200                            | -       | 202     | -       | 201               | 198     | 206     | 216     | 213     | 208               | 205                  |
| 00:17                | 209                            | -       | 210     | -       | 209               | 207     | 213     | 225     | 222     | 217               | 213                  |
| 00:18                | 217                            | -       | 217     | -       | 217               | 214     | 219     | 232     | 230     | 224               | 220                  |
| 00:19                | 224                            | -       | 223     | -       | 223               | 221     | 224     | 239     | 238     | 230               | 227                  |
| 00:20                | 230                            | -       | 229     | -       | 229               | 227     | 229     | 245     | 244     | 236               | 233                  |
| 00:21                | 235                            | -       | 235     | -       | 235               | 232     | 233     | 250     | 251     | 241               | 238                  |
| 00:22                | 240                            | -       | 240     | -       | 240               | 237     | 237     | 256     | 257     | 247               | 243                  |
| 00:23                | 245                            | -       | 246     | -       | 245               | 241     | 241     | 261     | 263     | 252               | 248                  |
| 00:24                | 249                            | -       | 248     | -       | 248               | 245     | 245     | 266     | 268     | 256               | 252                  |
| 00:25                | 254                            | -       | 253     | -       | 253               | 249     | 249     | 272     | 274     | 261               | 257                  |
| 00:26                | 258                            | -       | 258     | -       | 258               | 254     | 252     | 277     | 279     | 265               | 262                  |
| 00:27                | 262                            | -       | 262     | -       | 262               | 257     | 256     | 282     | 283     | 269               | 266                  |
| 00:28                | 266                            | -       | 267     | -       | 266               | 261     | 259     | 287     | 287     | 274               | 270                  |
| 00:29                | 270                            | -       | 270     | -       | 270               | 265     | 262     | 292     | 291     | 277               | 274                  |
| 00:30                | 274                            | -       | 275     | -       | 274               | 268     | 265     | 297     | 295     | 281               | 278                  |
| 00:31                | 277                            | -       | 278     | -       | 278               | 271     | 268     | 302     | 299     | 285               | 282                  |
| 00:32                | 281                            | -       | 283     | -       | 282               | 275     | 271     | 307     | 304     | 289               | 285                  |
| 00:33                | 284                            | -       | 287     | -       | 286               | 278     | 274     | 313     | 308     | 293               | 289                  |
| 00:34                | 287                            | -       | 292     | -       | 289               | 282     | 276     | 320     | 313     | 298               | 294                  |
| 00:35                | 290                            | -       | 295     | -       | 293               | 285     | 279     | 327     | 318     | 302               | 297                  |
| 00:36                | 293                            | -       | 300     | -       | 297               | 287     | 282     | 335     | 324     | 307               | 302                  |
| 00:37                | 296                            | -       | 305     | -       | 301               | 289     | 284     | 344     | 330     | 312               | 306                  |
| 00:38                | 299                            | -       | 313     | -       | 306               | 292     | 287     | 356     | 336     | 318               | 312                  |
| 00:39                | 301                            | -       | 322     | -       | 312               | 295     | 290     | 368     | 344     | 324               | 318                  |
| 00:40                | 304                            | -       | 328     | -       | 316               | -       | 292     | 380     | 352     | 341               | 329                  |
| 00:41                | 307                            | -       | 335     | -       | 321               | -       | 294     | 391     | 359     | 348               | 335                  |
| 00:42                | 309                            | -       | 342     | -       | 326               | -       | 296     | 401     | 365     | 354               | 340                  |
| 00:43                | 311                            | -       | 351     | -       | 331               | -       | 298     | 412     | 373     | 361               | 346                  |
| 00:44                | 313                            | -       | 362     | -       | 338               | -       | 301     | 425     | 383     | 370               | 354                  |
| 00:45                | 316                            | -       | 378     | -       | 347               | -       | 303     | 439     | 393     | 379               | 363                  |
| 00:46                | 318                            | -       | 397     | -       | 357               | -       | 306     | 454     | 405     | 388               | 373                  |
| 00:47                | 320                            | -       | 417     | -       | 369               | -       | 309     | 467     | 419     | 398               | 384                  |
| 00:48                | 323                            | -       | 435     | -       | 379               | -       | 313     | 480     | 433     | 408               | 394                  |
| 00:49                | 325                            | -       | 455     | -       | 390               | 309     | 316     | 493     | 450     | 392               | 391                  |
| 00:50                | 327                            | -       | 475     | -       | 401               | 311     | 319     | 506     | 469     | 401               | 401                  |
| 00:51                | 329                            | -       | 499     | -       | 414               | 314     | 323     | 518     | 487     | 411               | 412                  |
| 00:52                | 332                            | -       | 535     | -       | 433               | 316     | 327     | 530     | 504     | 419               | 426                  |
| 00:53                | 334                            | -       | 574     | -       | 454               | 318     | 331     | 543     | 523     | 429               | 441                  |
| 00:54                | 337                            | -       | 599     | -       | 468               | 320     | 336     | 558     | 543     | 439               | 454                  |
| 00:55                | 339                            | -       | 622     | -       | 481               | 322     | 341     | 572     | 562     | 449               | 465                  |

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| Time<br>(hr:min:sec) | Specimen No.3 Temperature (°C) |         |         |         |                   |         |         |         |         |                   |                      |
|----------------------|--------------------------------|---------|---------|---------|-------------------|---------|---------|---------|---------|-------------------|----------------------|
|                      | Level1                         |         |         |         |                   | Level2  |         |         |         |                   | Average<br>Level 1-2 |
|                      | Point 1                        | Point 2 | Point 3 | Point 4 | Average<br>Level1 | Point 5 | Point 6 | Point 7 | Point 8 | Average<br>Level2 |                      |
| 00:56                | 342                            | -       | 639     | -       | 490               | 324     | 347     | 586     | 580     | 459               | 475                  |
| 00:57                | 344                            | -       | 659     | -       | 501               | 325     | 353     | 600     | 595     | 468               | 485                  |
| 00:58                | 346                            | -       | 674     | -       | 510               | 327     | 359     | 612     | 611     | 477               | 494                  |
| 00:59                | 348                            | -       | 689     | -       | 518               | 328     | 365     | 624     | 627     | 486               | 502                  |
| 01:00                | 349                            | -       | 700     | -       | 525               | 329     | 372     | 636     | 642     | 495               | 510                  |
| 01:01                | 351                            | -       | 710     | -       | 531               | 331     | 378     | 647     | 655     | 503               | 517                  |
| 01:02                | 353                            | -       | 720     | -       | 536               | 332     | 384     | 658     | 666     | 510               | 523                  |
| 01:03                | 354                            | -       | 729     | -       | 542               | 333     | 390     | 669     | 679     | 518               | 530                  |
| 01:04                | 357                            | -       | 737     | -       | 547               | 335     | 395     | 680     | 689     | 525               | 536                  |
| 01:05                | 359                            | -       | 745     | -       | 552               | 336     | 401     | 690     | 698     | 531               | 542                  |

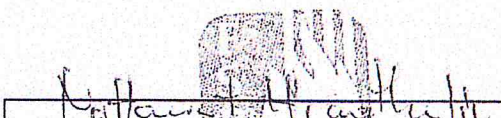
## SPECIMEN No.3 TEMPERATURE



Not a valid signature

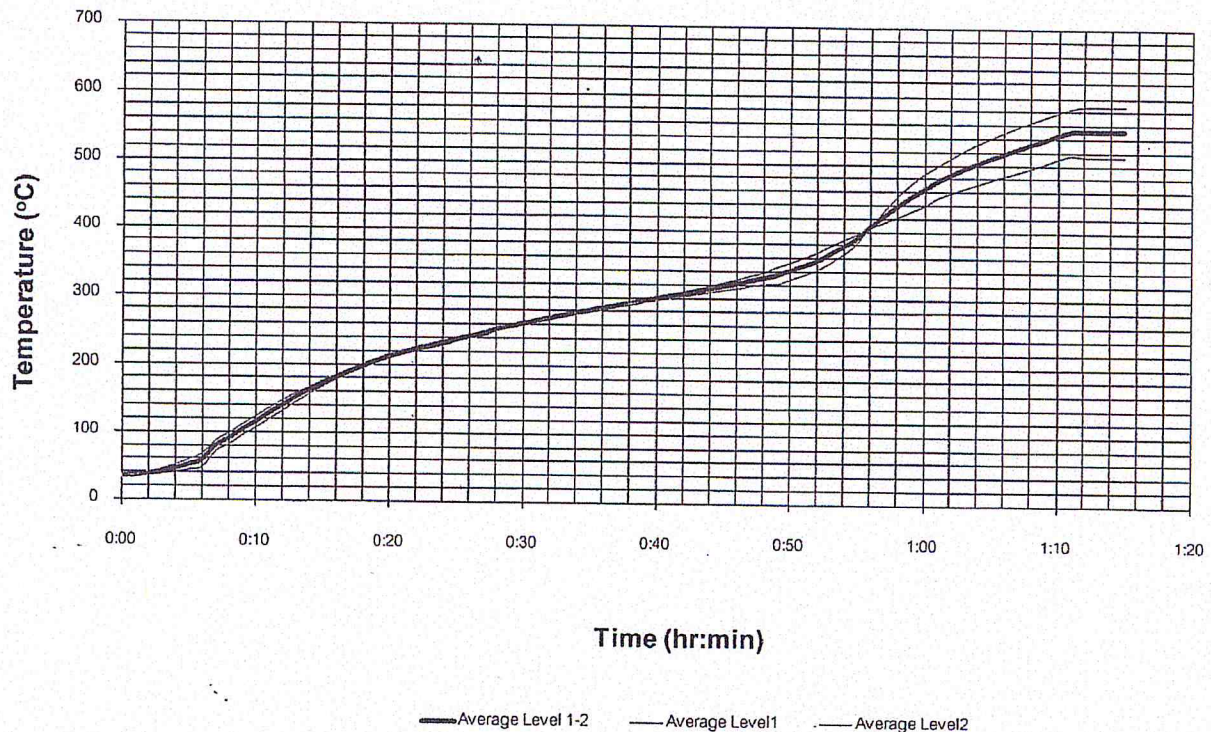
CLIENT : UNIQUE PRODUCTS (THAILAND) CO., LTD.  
 TESTED SPECIMENS : Neocoat Intumescent Paint-S Specimen No.4  
 DATE OF TEST : September 29, 2008

| Time<br>(hr:min:sec) | Specimen No.4 Temperature (°C) |         |         |         |                   |         |         |         |         |                   |                      |
|----------------------|--------------------------------|---------|---------|---------|-------------------|---------|---------|---------|---------|-------------------|----------------------|
|                      | Level1                         |         |         |         |                   | Level2  |         |         |         |                   | Average<br>Level 1-2 |
|                      | Point 1                        | Point 2 | Point 3 | Point 4 | Average<br>Level1 | Point 5 | Point 6 | Point 7 | Point 8 | Average<br>Level2 |                      |
| 00:00                | 34                             | 33      | 33      | 34      | 33                | 33      | 33      | 32      | 32      | 32                | 33                   |
| 00:01                | 36                             | 34      | 35      | 37      | 35                | 35      | 34      | 32      | 32      | 33                | 34                   |
| 00:02                | 39                             | 35      | 39      | 43      | 39                | 38      | 36      | 32      | 32      | 35                | 37                   |
| 00:03                | 44                             | 38      | 45      | 50      | 44                | 43      | 41      | 32      | 32      | 37                | 40                   |
| 00:04                | 50                             | 41      | 50      | 58      | 50                | 49      | 46      | 32      | 32      | 40                | 45                   |
| 00:05                | 59                             | 45      | 57      | 69      | 57                | 56      | 52      | 32      | 32      | 43                | 50                   |
| 00:06                | 70                             | 49      | 65      | 82      | 66                | 65      | 61      | 32      | 32      | 47                | 57                   |
| 00:07                | 83                             | -       | 77      | 96      | 85                | 77      | 72      | 62      | -       | 70                | 78                   |
| 00:08                | 96                             | -       | 86      | 108     | 97                | 89      | 83      | 70      | -       | 81                | 89                   |
| 00:09                | 110                            | -       | 99      | 122     | 110               | 101     | 97      | 80      | 98      | 94                | 102                  |
| 00:10                | 123                            | -       | 111     | 134     | 122               | 112     | 112     | 89      | 110     | 106               | 114                  |
| 00:11                | 136                            | -       | 123     | 147     | 135               | 124     | 128     | 100     | 125     | 119               | 127                  |
| 00:12                | 148                            | -       | 133     | 158     | 146               | 135     | 143     | 110     | 138     | 131               | 139                  |
| 00:13                | 160                            | -       | 143     | 170     | 157               | 148     | 158     | 122     | 152     | 145               | 151                  |
| 00:14                | 170                            | -       | 152     | 179     | 167               | 163     | 170     | 132     | 163     | 157               | 162                  |
| 00:15                | 179                            | -       | 161     | 188     | 176               | 173     | 182     | 143     | 173     | 168               | 172                  |
| 00:16                | 189                            | -       | 170     | 196     | 185               | 182     | 192     | 154     | 183     | 178               | 181                  |
| 00:17                | 198                            | -       | 177     | 204     | 193               | 190     | 200     | 165     | 191     | 186               | 190                  |
| 00:18                | 206                            | -       | 185     | 211     | 200               | 198     | 208     | 174     | 198     | 195               | 198                  |
| 00:19                | 214                            | -       | 192     | 218     | 208               | 204     | 216     | 183     | 205     | 202               | 205                  |
| 00:20                | 220                            | -       | 199     | 224     | 214               | 211     | 223     | 190     | 211     | 209               | 212                  |
| 00:21                | 227                            | -       | 204     | 231     | 220               | 215     | 229     | 198     | 216     | 214               | 217                  |
| 00:22                | 232                            | -       | 210     | 236     | 226               | 221     | 235     | 202     | 221     | 220               | 223                  |
| 00:23                | 237                            | -       | 215     | 242     | 231               | 225     | 241     | 207     | 225     | 224               | 228                  |
| 00:24                | 241                            | -       | 220     | 247     | 236               | 226     | 246     | 212     | 229     | 228               | 232                  |
| 00:25                | 246                            | -       | 224     | 253     | 241               | 234     | 252     | 219     | 233     | 234               | 238                  |
| 00:26                | 251                            | -       | 228     | 257     | 245               | 240     | 257     | 222     | 237     | 239               | 242                  |
| 00:27                | 255                            | -       | 232     | 262     | 250               | 241     | 263     | 225     | 241     | 242               | 246                  |
| 00:28                | 259                            | -       | 235     | 267     | 254               | 263     | 268     | 225     | 245     | 250               | 252                  |
| 00:29                | 264                            | -       | 239     | 271     | 258               | 266     | 274     | 229     | 248     | 254               | 256                  |
| 00:30                | 267                            | -       | 243     | 275     | 262               | 272     | 279     | 233     | 252     | 259               | 260                  |
| 00:31                | 272                            | -       | 246     | 280     | 266               | 278     | 284     | 238     | 255     | 264               | 265                  |
| 00:32                | 276                            | -       | 250     | 284     | 270               | 283     | 289     | 240     | 259     | 268               | 269                  |
| 00:33                | 279                            | -       | 253     | 289     | 274               | 289     | 294     | 245     | 262     | 272               | 273                  |
| 00:34                | 283                            | -       | 257     | 292     | 277               | 295     | 299     | 250     | 265     | 277               | 277                  |
| 00:35                | 287                            | -       | 260     | 295     | 281               | 293     | 304     | 257     | 268     | 280               | 280                  |
| 00:36                | 290                            | -       | 263     | 299     | 284               | 298     | 308     | 262     | 271     | 285               | 284                  |
| 00:37                | 293                            | -       | 266     | 302     | 287               | 305     | 311     | 265     | 273     | 289               | 288                  |
| 00:38                | 296                            | -       | 269     | 306     | 290               | 311     | 316     | 268     | 276     | 293               | 291                  |
| 00:39                | 299                            | -       | 272     | 310     | 293               | 318     | 322     | 271     | 278     | 297               | 295                  |
| 00:40                | 302                            | -       | 274     | 313     | 296               | 323     | 327     | 275     | 281     | 302               | 299                  |
| 00:41                | 305                            | -       | 277     | 316     | 299               | 328     | 332     | 278     | 284     | 306               | 302                  |
| 00:42                | 309                            | -       | 279     | 318     | 302               | 333     | 335     | 281     | 286     | 309               | 306                  |
| 00:43                | 312                            | -       | 282     | 322     | 305               | 340     | 340     | 284     | 289     | 313               | 309                  |
| 00:44                | 316                            | -       | 284     | 326     | 309               | 348     | 345     | 288     | 291     | 318               | 313                  |
| 00:45                | 320                            | -       | 287     | 329     | 312               | 357     | 350     | 290     | 293     | 323               | 317                  |
| 00:46                | 324                            | -       | 289     | 332     | 315               | 365     | 356     | 293     | 296     | 327               | 321                  |
| 00:47                | 328                            | -       | 292     | 335     | 318               | 374     | 363     | 297     | 298     | 333               | 326                  |
| 00:48                | 333                            | -       | 294     | 338     | 322               | 380     | 370     | 299     | 301     | 338               | 330                  |
| 00:49                | 341                            | -       | 296     | 328     | 322               | 398     | 379     | 303     | 304     | 346               | 334                  |
| 00:50                | 351                            | -       | 298     | 336     | 328               | 408     | 390     | 307     | 308     | 353               | 341                  |
| 00:51                | 361                            | -       | 300     | 345     | 335               | 418     | 402     | 310     | 311     | 360               | 348                  |
| 00:52                | 370                            | -       | 302     | 355     | 343               | 430     | 415     | 313     | 314     | 368               | 355                  |
| 00:53                | 386                            | -       | 309     | 366     | 354               | 451     | 427     | 318     | 317     | 378               | 366                  |
| 00:54                | 399                            | -       | 309     | 392     | 367               | 471     | 437     | 322     | 320     | 387               | 377                  |
| 00:55                | 412                            | -       | 309     | 428     | 383               | 489     | 446     | 324     | 324     | 396               | 389                  |



| Time<br>(hr:min:sec) | Specimen No.4 Temperature (°C) |         |         |         |                   |         |         |         |         |                   |                      |
|----------------------|--------------------------------|---------|---------|---------|-------------------|---------|---------|---------|---------|-------------------|----------------------|
|                      | Level1                         |         |         |         |                   | Level2  |         |         |         |                   | Average<br>Level 1-2 |
|                      | Point 1                        | Point 2 | Point 3 | Point 4 | Average<br>Level1 | Point 5 | Point 6 | Point 7 | Point 8 | Average<br>Level2 |                      |
| 00:56                | 440                            | -       | 311     | 472     | 408               | 508     | 457     | 328     | 328     | 405               | 406                  |
| 00:57                | 471                            | -       | 313     | 510     | 431               | 523     | 469     | 331     | 332     | 414               | 422                  |
| 00:58                | 501                            | -       | 315     | 541     | 452               | 534     | 480     | 334     | 337     | 421               | 437                  |
| 00:59                | 529                            | -       | 317     | 567     | 471               | 550     | 491     | 338     | 341     | 430               | 450                  |
| 01:00                | 554                            | -       | 320     | 585     | 486               | 569     | 499     | 341     | 344     | 438               | 462                  |
| 01:01                | 576                            | -       | 322     | 599     | 499               | 595     | 509     | 351     | 348     | 451               | 475                  |
| 01:02                | 595                            | -       | 324     | 612     | 510               | 607     | 519     | 354     | 352     | 458               | 484                  |
| 01:03                | 613                            | -       | 326     | 628     | 522               | 619     | 529     | 356     | 357     | 465               | 494                  |
| 01:04                | 628                            | -       | 329     | 640     | 532               | 627     | 539     | 356     | 363     | 471               | 502                  |
| 01:05                | 641                            | -       | 331     | 652     | 541               | 635     | 550     | 358     | 368     | 478               | 509                  |
| 01:06                | 652                            | -       | 334     | 662     | 550               | 640     | 560     | 360     | 374     | 484               | 517                  |
| 01:07                | 663                            | -       | 337     | 672     | 557               | 646     | 572     | 362     | 380     | 490               | 524                  |
| 01:08                | 673                            | -       | 340     | 681     | 565               | 652     | 582     | 364     | 386     | 496               | 530                  |
| 01:09                | 683                            | -       | 342     | 690     | 572               | 658     | 592     | 366     | 392     | 502               | 537                  |
| 01:10                | 692                            | -       | 345     | 698     | 579               | 669     | 603     | 370     | 398     | 510               | 544                  |
| 01:11                | 700                            | -       | 348     | 707     | 585               | 672     | 613     | 371     | 404     | 515               | 550                  |
| 01:12                | 704                            | -       | 350     | 710     | 588               | 660     | 618     | 365     | 407     | 513               | 550                  |
| 01:13                | 704                            | -       | 350     | 710     | 588               | 660     | 618     | 365     | 407     | 513               | 550                  |
| 01:14                | 704                            | -       | 350     | 710     | 588               | 660     | 618     | 365     | 407     | 513               | 550                  |
| 01:15                | 704                            | -       | 350     | 710     | 588               | 660     | 618     | 365     | 407     | 513               | 550                  |

## SPECIMEN No.4 TEMPERATURE



APPENDIX C: THICKNESS OF FIRE PROTECTION COATING

| Specimen No. | Structural Member | Hp/A (m <sup>-1</sup> ) | * Thickness(μm) |      |      |      |      |      |      |      |      |      |      |      |         |      |        | Result | Remark |
|--------------|-------------------|-------------------------|-----------------|------|------|------|------|------|------|------|------|------|------|------|---------|------|--------|--------|--------|
|              |                   |                         | Position        |      |      |      |      |      |      |      |      |      |      |      |         |      |        |        |        |
|              |                   |                         | 1               | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | Average |      |        |        |        |
| 1            | H 200x200x8x12 mm | 191                     | 495             | 515  | 560  | 570  | 550  | 550  | 490  | 465  | 495  | 520  | 535  | 515  | 522     | 514  | SB500  |        |        |
|              |                   |                         | 565             | 455  | 465  | 485  | 535  | 545  | 460  | 485  | 535  | 510  | 525  | 520  | 507     |      |        |        |        |
|              |                   |                         | 855             | 835  | 820  | 725  | 815  | 835  | 790  | 810  | 800  | 760  | 830  | 875  | 813     |      |        |        |        |
| 2            | H 200x200x8x12 mm | 191                     | 875             | 890  | 870  | 770  | 750  | 880  | 825  | 815  | 860  | 815  | 755  | 815  | 827     | 820  | SB750  |        |        |
|              |                   |                         | 1045            | 1010 | 1235 | 1025 | 1035 | 1125 | 1215 | 1065 | 1085 | 1075 | 1010 | 1045 | 1081    |      |        |        |        |
|              |                   |                         | 1065            | 1100 | 1170 | 1175 | 1085 | 1105 | 1095 | 1070 | 1120 | 1095 | 1125 | 1065 | 1106    |      |        |        |        |
| 3            | H 200x200x8x12 mm | 191                     | 1330            | 1035 | 1135 | 1160 | 1540 | 1025 | 1355 | 1005 | 1110 | 1160 | 1150 | 1085 | 1174    | 1093 | SB1000 |        |        |
|              |                   |                         | 1290            | 1075 | 1215 | 1280 | 1380 | 1015 | 1260 | 1125 | 1220 | 1230 | 1230 | 1055 | 1198    |      |        |        |        |
|              |                   |                         |                 |      |      |      |      |      |      |      |      |      |      |      |         |      |        |        |        |
| 4            | H 200x200x8x12 mm | 191                     |                 |      |      |      |      |      |      |      |      |      |      |      |         | 1186 | SB1250 |        |        |
|              |                   |                         |                 |      |      |      |      |      |      |      |      |      |      |      |         |      |        |        |        |
|              |                   |                         |                 |      |      |      |      |      |      |      |      |      |      |      |         |      |        |        |        |

Note: See Figure B-1 for the location of thickness measurements



APPENDIX D: PHOTOGRAPHS

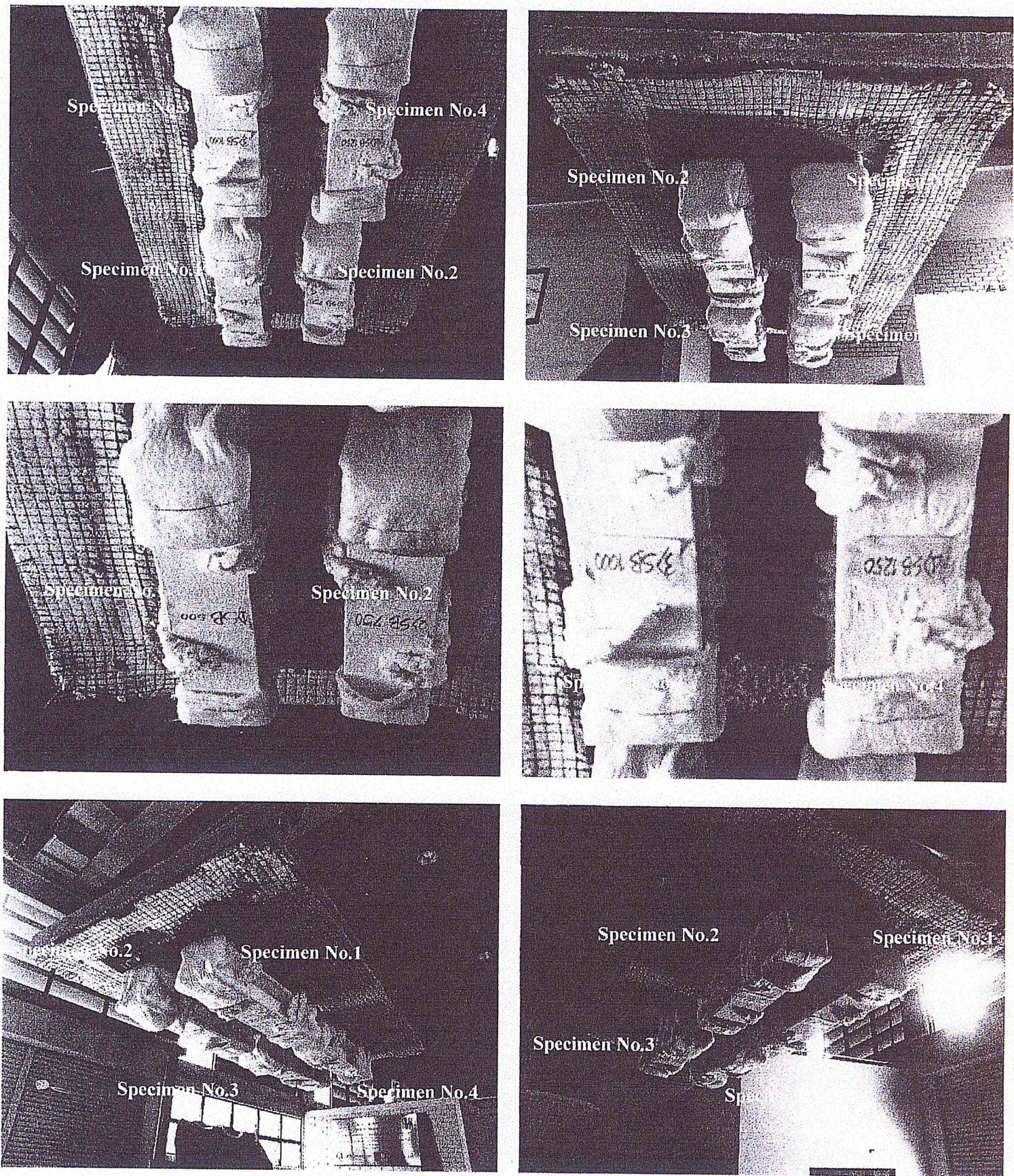


Figure D-1: Specimen preparation prior to testing

*Handwritten signature*

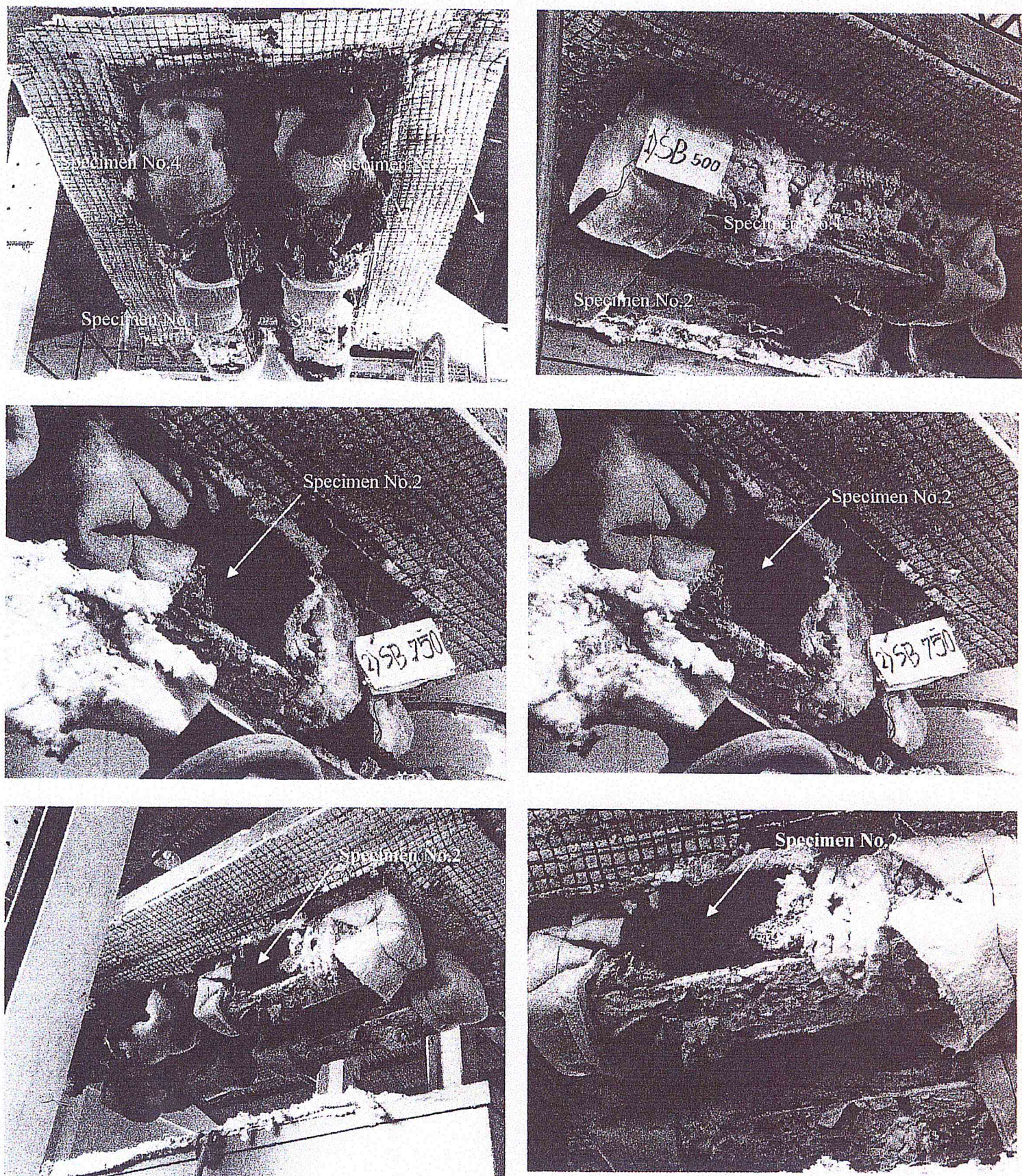


Figure D-2: The specimens after testing

*Handwritten signature*

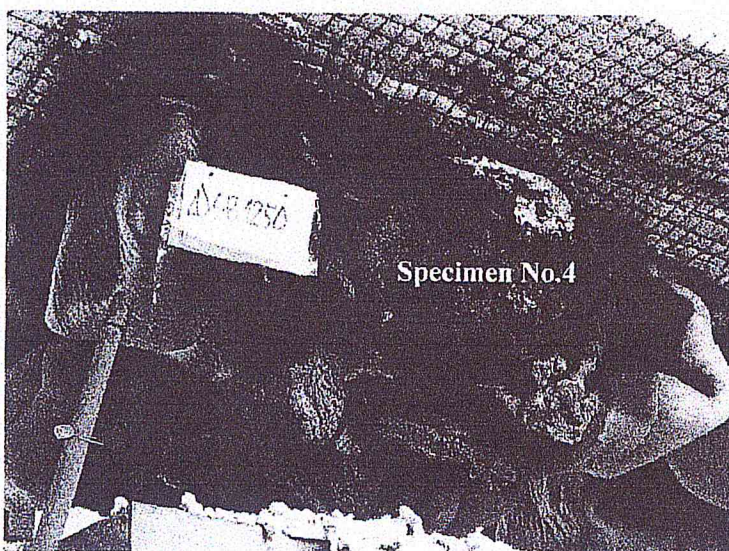
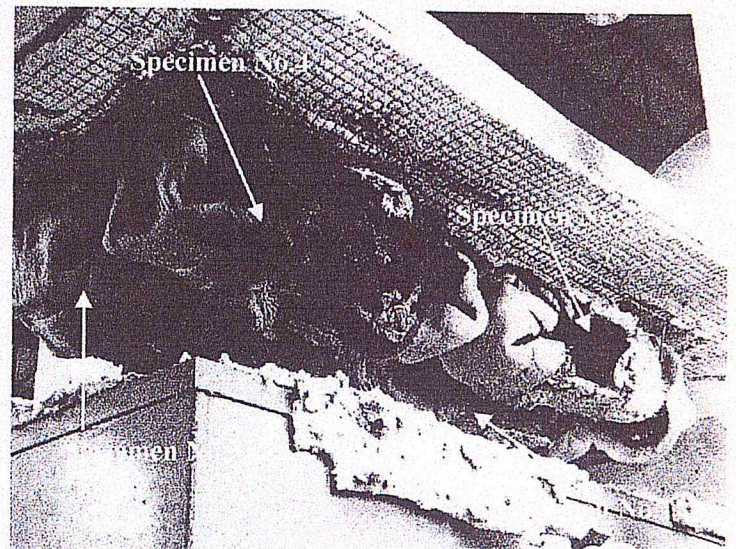
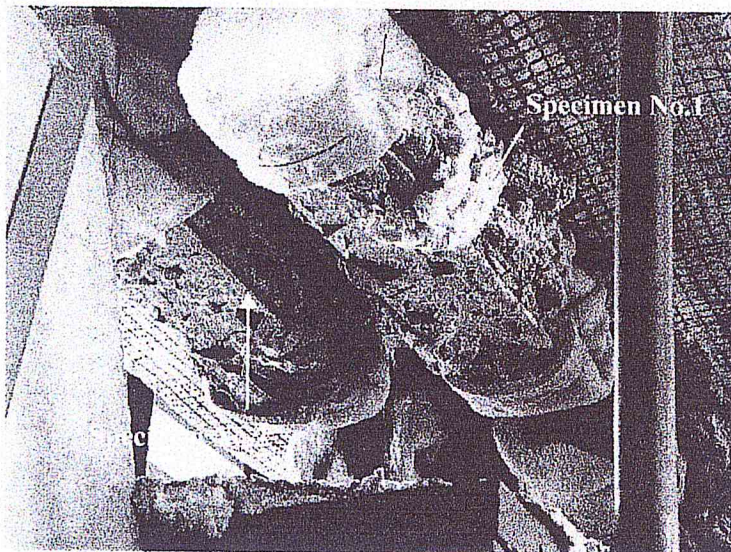
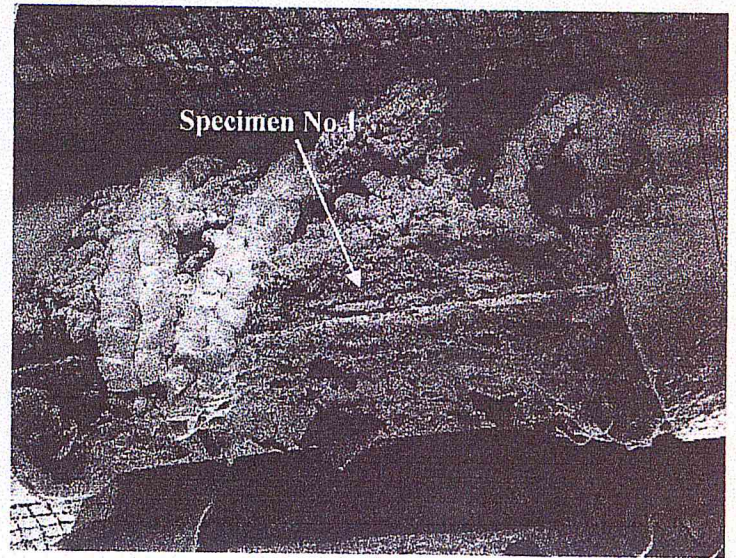
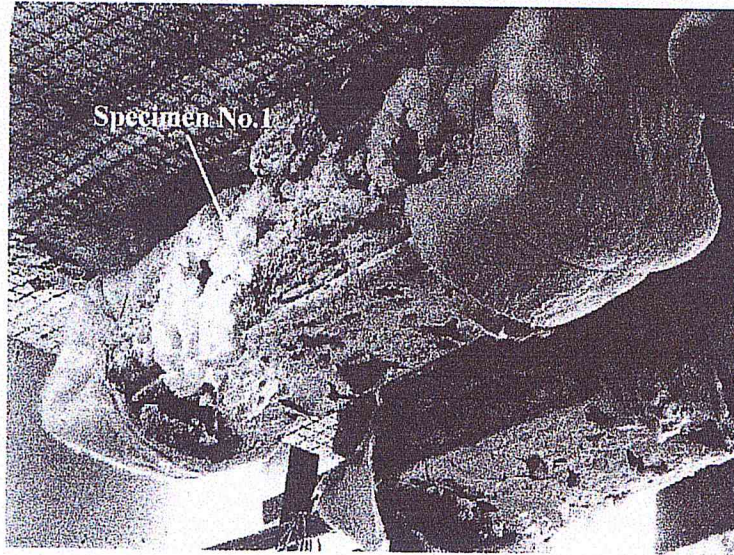


Figure D-2 (continued): The specimens after testing

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