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| --- | --- |
| نام اتصال تیر به ستون: | mafsali1 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | گزارش وصله اتصال(ورق های طولی) | | | مشخصات کلی اتصال | $level3$ | | |  |  |  | | --- | --- | --- | | مشخصات ورقهای طولی بالایی جهت 2 اتصال(بال) | | | | طول |  | 0.0 | | عرض |  | 0.0 | | ضخامت |  | 0.0 | | بعد جوش در جهت مثبت |  | ندارد | | بعد جوش در جهت منفی |  | ندارد | | |  |  |  | | --- | --- | --- | | مشخصات ورقهای طولی بالایی جهت 3 اتصال(جان) | | | | طول |  | 15.0 | | عرض |  | 17.0 | | ضخامت |  | 8.0 | | بعد جوش در جهت مثبت |  | ندارد | | بعد جوش در جهت منفی |  | ندارد | | | |  |  |  | | --- | --- | --- | | مشخصات ورقهای طولی پائینی جهت 2 اتصال(بال) | | | | طول |  | 0.0 | | عرض |  | 0.0 | | ضخامت |  | 0.0 | | بعد جوش در جهت مثبت |  | ندارد | | بعد جوش در جهت منفی |  | ندارد |  |  |  | | --- | --- | | نیروی محوری نهایی | 0.00 100 0.00 | | لنگر نهایی | 0.00 100 0.00 | | نیروی برشی نهایی | 0.01 100 0.01 | | |  |  |  | | --- | --- | --- | | ضریب آگاهی جوش در کارگاه |  | 0.7500 | | ضریب آگاهی جوش در کارخانه |  | 1.0000 | | مقاومت نهایی فلز الکترود |  | 4200.0 | | تنش تسلیم ورق اتصال |  | 2400.0 | | حداقل فاصله مورد نیاز جوشکاری |  | 5.0 | | درز انقطاع |  | 1.0 | | |  | |

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| |  |  |  |  | | --- | --- | --- | --- | | گزارش اتصال تير به ستون بخش مياني جهت مثبت | | | | | کنترل پیچ ها | | $level3$ | | | مشخصات کلی پیچ ها | | $level4$ | | | |  |  |  | | --- | --- | --- | | مشخصات پیچ ها |  | BOLT12\*35-6914 | | قطر |  | 12.0 | | طول |  | 3.5 | | طول رزوه شده |  | 2.1 | | تنش تسلیم |  | 9582.1 | | مقاومت نهایی کششی |  | 10601.4 | | واشر ابتدایی |  | ندارد | | واشر انتهایی |  | ندارد | | ضخامت مهره |  | 8.0 | | |  |  | | --- | --- | | نوع پیچ ها: | پيچ پر مقاومت | | برش ورقها با گیوتین: | بلي | | سوراخکاری با پانچ: | بلي | | پیچ ها تحت اثر خوردگی: | خير | | ضریب اصطکاک سطوح: | 0.30 | | | $MainImage$ | | |
|  | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | کنترل طول پيچ ها | | | | | | $level4$ | | | | شماره پيچهاي داراي مشکل: | | | هيچکدام | | |  | $MainBoltPic$ |  | | ندارد | | $MinRes$ | 22.2 14.0 | | |  | ّ$Frame$ | 22.2 22.2 |  | | $MaxRes$ | 22.2 23.8 | | |  | ّ$Frame$ |  | | ندارد | |  |  |  | | |  | 8.0 | | 4.8 4.8 |  | |  |  | |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | کنترل هندسی اجزاء اتصال | | $level4$ | | | | ّ$Frame$ | پیچ هایی که با المان های اطراف تداخل دارند: | | هيچکدام | $CollisionImg$ | | ّ$Frame$ | پیچ هایی که در انتقال نیرو سهم ندارند: | | هيچکدام | $ForceCarryImg$ | |

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| (بند10-2-9-3-2-پ) مبحث 10-1392 | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | کنترل حداقل فاصله پیچ ها از یکدیگر | | | $level4$ | | | | شماره بحرانی ترین پیچ ها: | 1, 2 | | |  |  | |  |  | | | 100.0 |  | |  | | 12.0 | |  |  | |  | | 36.0 mm | |  |  | | $BoltDistanceResult$ | | 100.0 36.0 | |  | $Frame11$ | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| (بند10-2-9-3-2-ج) مبحث 10-1392 | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | کنترل حداکثر فاصله پیچ ها از یکدیگر | | | $level4$ | | | | |  |  | | | 100.0 | |  | |  |  | | | 6.2 | |  | | (پیچ ها تحت تاثیر خوردگی شدید قرار دارند) | |  | |  |  | $FC14$ | | (پیچ ها تحت تاثیر خوردگی کم و متوسط قرار دارند) | | 148.8 mm | |  | $FC24$ | | $CtrlPic$ | 100.0 148.8 | | |  | | $Frame$ | |

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| (بند10-2-9-3-2(ت)) مبحث 10-1392 | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | کنترل حداقل فاصله پیچ ها از لبه ورق | | | $level4$ | | | | | شماره بحرانی ترین پیچ: | 1 | | | | | | |  | | | | 25.0 | |  | | (ورق ها با گیوتین برش خورده اند) | | 24.0 mm | |  |  | $DistMin1Image$ | | (ورق ها با گیوتین برش نخورده اند) | |  | |  | $Distmin2Image$ | | $Result$ | | 25.0 24.0 | |  | | ّ$Frame$ | |

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| (بند10-2-9-3-2-ث) مبحث 10-1392 | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | کنترل حداکثر فاصله پیچ ها از لبه ورق | | | | | $level4$ | | | | | شماره بحرانی ترین پیچ: | 1 | | | | | | | | |  | | | | | | 45.0 | |  | |  | | | | | | 6.2 | |  | | پیچ ها تحت اثر خوردگی شدید قرار دارند | | |  | | |  |  | $DistMax1Image$ | | پیچ ها تحت اثر خوردگی کم و متوسط قرار دارند | | | | 74.4 mm | |  | $DistMax2Image$ | | $Result$ | | 45.0 74.4 | | | |  | | ّ$Frame$ | |

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|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | نحوه محاسبه نیرو در محل پیچ بحرانی | | $level4$ | | | | فاصله مرکز سطح پیچ­ها تا وسط ورق وصله جان | 5.0 | |  |  | | تعداد پیچ­ها | 2 | |  |  | |  | 0.00 | |  |  | |  | -0.01 | |  |  | | لنگر پیچشی در محل مرکز سطح پیچ­ها | 0.00 | |  |  | | ممان اینرسی قطبی پیچ­ها | 50.00 | |  |  | | فاصله افقی پیچ­ بحرانی تا محل مرکز سطح پیچ ها | 0.0 | |  |  | | فاصله قائم پیچ­ بحرانی تا محل مرکز سطح پیچ ها | -5.0 | |  |  | | نیروی افقی ناشی از پیچش در محل پیچ بحرانی | 0.00 | |  |  | | نیروی قائم ناشی از پیچش در محل پیچ بحرانی | 0.00 | |  |  | | نیروی ناشی از برش در محل پیچ­ها | 0.00 | |  |  | | نیروی نهایی ناشی از اثر توام پیچش و برش در محل پیچ بحرانی | 0.00 | |  |  | |

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| (بند10-2-9-3-7) مبحث 10-1392 | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | کنترل اندرکنش پیچ ها و ورق ها | | | $level3$ | | | | | کنترل مقاومت اتکایی بین پیچ و ورق | | | $level4$ | | | | | شماره بحرانی ترین پیچ: | | 1 | | | | |  | | |  |  |  | | --- | --- | --- | | مشخصات ورق | | | | نوع ورق |  | المان | | ضخامت |  | 6.2 | | مقاومت نهایی کششی |  | 3700.0 | | حداقل فاصله خالص بین لبه سوراخ و لبه سوراخ دیگر یا لبهی آزاد ورق در راستای نیرو­­­ |  | 55.6 | | | | |  | | |  | | نیروی نهایی وارد بر جداره هر سوراخ | | 0.00 |  | | ضریب کاهش مقاومت | | | | 0.75 | | |  | | 4.96 | | | |  | | |  | | $Result$ | | | 0.00 4.96 *n* | |  | | ّ$Frame$ | |

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|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | نحوه محاسبه نیرو در محل پیچ بحرانی | | $level4$ | | | | فاصله مرکز سطح پیچ­ها تا وسط ورق وصله جان | 5.0 | |  |  | | تعداد پیچ­ها | 2 | |  |  | |  | 0.00 | |  |  | |  | 0.00 | |  |  | | لنگر پیچشی در محل مرکز سطح پیچ­ها | 0.00 | |  |  | | ممان اینرسی قطبی پیچ­ها | 50.00 | |  |  | | فاصله افقی پیچ­ بحرانی تا محل مرکز سطح پیچ ها | 0.0 | |  |  | | فاصله قائم پیچ­ بحرانی تا محل مرکز سطح پیچ ها | -5.0 | |  |  | | نیروی افقی ناشی از پیچش در محل پیچ بحرانی | 0.00 | |  |  | | نیروی قائم ناشی از پیچش در محل پیچ بحرانی | 0.00 | |  |  | | نیروی ناشی از برش در محل پیچ­ها | 0.00 | |  |  | | نیروی نهایی ناشی از اثر توام پیچش و برش در محل پیچ بحرانی | 0.00 | |  |  | |

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| (بند10-2-9-3-3) مبحث 10-1392 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | کنترل مقاومت برشی پیچ | | | | $level4$ | | | | | شماره بحرانی ترین پیچ: | 1 | | | | | |  | | بیشینه نیروی نهایی روی سطح برش پیچ | |  | | | 0.00 | |  | |  | | | نوع پیچ ها: پيچ پر مقاومت | | |  |  | | رفتار اصطکاکي | | | | پيچ ها تحت اثر توام کشش و برش نمي باشند | | | |

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| (بند10-2-9-3-5) مبحث 10-1392 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | حداقل نیروی پیش تنیدگی پیچ مطابق جدول(10-2-9-7) | | 6.25 |  |  | | ضریب کاهش مقاومت |  | | 1.00 |  | | نسبت پیش تنیدگی متوسط پیچ ها به پیش تنیدگی حداقل پیچ ها | | | 1.13 |  | | ضریب اصطکاک | | | 0.30 |  | | ضریب کاهش به خاطر وجود ورق های پر کننده در بین قطعات متصل به یکدیگر | | | 1.00 |  | | تعداد صفحات لغزش |  | | 2 |  | |  | 4.24 | |  |  | |

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| |  |  |  |  | | --- | --- | --- | --- | | گزارش اتصال تير به ستون بخش مياني جهت منفي | | | | | کنترل پیچ ها | | $level3$ | | | مشخصات کلی پیچ ها | | $level4$ | | | |  |  |  | | --- | --- | --- | | مشخصات پیچ ها |  | BOLT12\*35-6914 | | قطر |  | 12.0 | | طول |  | 3.5 | | طول رزوه شده |  | 2.1 | | تنش تسلیم |  | 9582.1 | | مقاومت نهایی کششی |  | 10601.4 | | واشر ابتدایی |  | ندارد | | واشر انتهایی |  | ندارد | | ضخامت مهره |  | 8.0 | | |  |  | | --- | --- | | نوع پیچ ها: | پيچ پر مقاومت | | برش ورقها با گیوتین: | بلي | | سوراخکاری با پانچ: | بلي | | پیچ ها تحت اثر خوردگی: | خير | | ضریب اصطکاک سطوح: | 0.30 | | | $MainImage$ | | |
|  | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | کنترل طول پيچ ها | | | | | | $level4$ | | | | شماره پيچهاي داراي مشکل: | | | هيچکدام | | |  | $MainBoltPic$ |  | | ندارد | | $MinRes$ | 22.2 14.0 | | |  | ّ$Frame$ | 22.2 22.2 |  | | $MaxRes$ | 22.2 23.8 | | |  | ّ$Frame$ |  | | ندارد | |  |  |  | | |  | 8.0 | | 4.8 4.8 |  | |  |  | |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | کنترل هندسی اجزاء اتصال | | $level4$ | | | | ّ$Frame$ | پیچ هایی که با المان های اطراف تداخل دارند: | | هيچکدام | $CollisionImg$ | | ّ$Frame$ | پیچ هایی که در انتقال نیرو سهم ندارند: | | هيچکدام | $ForceCarryImg$ | |

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| (بند10-2-9-3-2-پ) مبحث 10-1392 | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | کنترل حداقل فاصله پیچ ها از یکدیگر | | | $level4$ | | | | شماره بحرانی ترین پیچ ها: | 1, 2 | | |  |  | |  |  | | | 100.0 |  | |  | | 12.0 | |  |  | |  | | 36.0 mm | |  |  | | $BoltDistanceResult$ | | 100.0 36.0 | |  | $Frame11$ | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| (بند10-2-9-3-2-ج) مبحث 10-1392 | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | کنترل حداکثر فاصله پیچ ها از یکدیگر | | | $level4$ | | | | |  |  | | | 100.0 | |  | |  |  | | | 6.2 | |  | | (پیچ ها تحت تاثیر خوردگی شدید قرار دارند) | |  | |  |  | $FC14$ | | (پیچ ها تحت تاثیر خوردگی کم و متوسط قرار دارند) | | 148.8 mm | |  | $FC24$ | | $CtrlPic$ | 100.0 148.8 | | |  | | $Frame$ | |

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| (بند10-2-9-3-2(ت)) مبحث 10-1392 | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | کنترل حداقل فاصله پیچ ها از لبه ورق | | | $level4$ | | | | | شماره بحرانی ترین پیچ: | 1 | | | | | | |  | | | | 25.0 | |  | | (ورق ها با گیوتین برش خورده اند) | | 24.0 mm | |  |  | $DistMin1Image$ | | (ورق ها با گیوتین برش نخورده اند) | |  | |  | $Distmin2Image$ | | $Result$ | | 25.0 24.0 | |  | | ّ$Frame$ | |

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| (بند10-2-9-3-2-ث) مبحث 10-1392 | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | کنترل حداکثر فاصله پیچ ها از لبه ورق | | | | | $level4$ | | | | | شماره بحرانی ترین پیچ: | 1 | | | | | | | | |  | | | | | | 45.0 | |  | |  | | | | | | 6.2 | |  | | پیچ ها تحت اثر خوردگی شدید قرار دارند | | |  | | |  |  | $DistMax1Image$ | | پیچ ها تحت اثر خوردگی کم و متوسط قرار دارند | | | | 74.4 mm | |  | $DistMax2Image$ | | $Result$ | | 45.0 74.4 | | | |  | | ّ$Frame$ | |

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|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | نحوه محاسبه نیرو در محل پیچ بحرانی | | $level4$ | | | | فاصله مرکز سطح پیچ­ها تا وسط ورق وصله جان | 5.0 | |  |  | | تعداد پیچ­ها | 2 | |  |  | |  | 0.00 | |  |  | |  | -0.01 | |  |  | | لنگر پیچشی در محل مرکز سطح پیچ­ها | 0.00 | |  |  | | ممان اینرسی قطبی پیچ­ها | 50.00 | |  |  | | فاصله افقی پیچ­ بحرانی تا محل مرکز سطح پیچ ها | 0.0 | |  |  | | فاصله قائم پیچ­ بحرانی تا محل مرکز سطح پیچ ها | -5.0 | |  |  | | نیروی افقی ناشی از پیچش در محل پیچ بحرانی | 0.00 | |  |  | | نیروی قائم ناشی از پیچش در محل پیچ بحرانی | 0.00 | |  |  | | نیروی ناشی از برش در محل پیچ­ها | 0.00 | |  |  | | نیروی نهایی ناشی از اثر توام پیچش و برش در محل پیچ بحرانی | 0.00 | |  |  | |

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| (بند10-2-9-3-7) مبحث 10-1392 | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | کنترل اندرکنش پیچ ها و ورق ها | | | $level3$ | | | | | کنترل مقاومت اتکایی بین پیچ و ورق | | | $level4$ | | | | | شماره بحرانی ترین پیچ: | | 1 | | | | |  | | |  |  |  | | --- | --- | --- | | مشخصات ورق | | | | نوع ورق |  | المان | | ضخامت |  | 6.2 | | مقاومت نهایی کششی |  | 3700.0 | | حداقل فاصله خالص بین لبه سوراخ و لبه سوراخ دیگر یا لبهی آزاد ورق در راستای نیرو­­­ |  | 55.6 | | | | |  | | |  | | نیروی نهایی وارد بر جداره هر سوراخ | | 0.00 |  | | ضریب کاهش مقاومت | | | | 0.75 | | |  | | 4.96 | | | |  | | |  | | $Result$ | | | 0.00 4.96 *n* | |  | | ّ$Frame$ | |

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|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | نحوه محاسبه نیرو در محل پیچ بحرانی | | $level4$ | | | | فاصله مرکز سطح پیچ­ها تا وسط ورق وصله جان | 5.0 | |  |  | | تعداد پیچ­ها | 2 | |  |  | |  | 0.00 | |  |  | |  | 0.00 | |  |  | | لنگر پیچشی در محل مرکز سطح پیچ­ها | 0.00 | |  |  | | ممان اینرسی قطبی پیچ­ها | 50.00 | |  |  | | فاصله افقی پیچ­ بحرانی تا محل مرکز سطح پیچ ها | 0.0 | |  |  | | فاصله قائم پیچ­ بحرانی تا محل مرکز سطح پیچ ها | -5.0 | |  |  | | نیروی افقی ناشی از پیچش در محل پیچ بحرانی | 0.00 | |  |  | | نیروی قائم ناشی از پیچش در محل پیچ بحرانی | 0.00 | |  |  | | نیروی ناشی از برش در محل پیچ­ها | 0.00 | |  |  | | نیروی نهایی ناشی از اثر توام پیچش و برش در محل پیچ بحرانی | 0.00 | |  |  | |

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| (بند10-2-9-3-3) مبحث 10-1392 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | کنترل مقاومت برشی پیچ | | | | $level4$ | | | | | شماره بحرانی ترین پیچ: | 1 | | | | | |  | | بیشینه نیروی نهایی روی سطح برش پیچ | |  | | | 0.01 | |  | |  | | | نوع پیچ ها: پيچ پر مقاومت | | |  |  | | رفتار اصطکاکي | | | | پيچ ها تحت اثر توام کشش و برش نمي باشند | | | |

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| (بند10-2-9-3-5) مبحث 10-1392 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | حداقل نیروی پیش تنیدگی پیچ مطابق جدول(10-2-9-7) | | 6.25 |  |  | | ضریب کاهش مقاومت |  | | 1.00 |  | | نسبت پیش تنیدگی متوسط پیچ ها به پیش تنیدگی حداقل پیچ ها | | | 1.13 |  | | ضریب اصطکاک | | | 0.30 |  | | ضریب کاهش به خاطر وجود ورق های پر کننده در بین قطعات متصل به یکدیگر | | | 1.00 |  | | تعداد صفحات لغزش |  | | 2 |  | |  | 8.48 | |  |  | |

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| تصویر جزئیات اتصال | $level3$ |
| $SheetImage$ | |