NES
Nasional Energi Semesta

# The Flanges & Fittings Specialist



SUSTAINABLE
CERTIFICATION
ISO 45001
ISO 9001

www.nasionalenergi.id

# PRODUCT

## Butt Weld Fittings

Cap, Elbow (45/90/180; LR/SR), Reducer (Concentric/Eccentric), Tee (Cross/Straight/Reducing)

1/2" - 24" Seamless &>24" Welded; STD, XS, XXS, S10, S20, S30, S40, S60, S80, S100. S120, S140, S160

| | | |
|---|---|---|
| Carbon Steel | - | ASME/ASTM SA/A234 WPB, WPC |
| Low Temp | - | ASME/ASTM SA/A420 WPL6 |
| Stainless Steel | - | ASME/ASTM SA/A403 WPS 304/L, 316/L, 321/H |
| Duplex SS | - | ASME/ASTM SA/A815 UNS S31803/S32205 |
| Super Duplex | - | ASME/ASTM SA/A815 UNS S32750/S32760 |
| Alloy | - | ASME/ASTM SA/A234 WP5, 11, 22, 91 |
| High Yield | - | ASME/ASTM SA/A860 WPHY52, 60, 65, 70 |

## Flanges

FF/RF/RTJ ; Blind, Lap-joint, Slip-on, Socket weld, Threaded, Welding Neck & Long Weld Neck

1/2" - 36" ; 150LB/300LB/600LB/900LB/1500LB/2500LB/5000PSI

| | | |
|---|---|---|
| Carbon Steel | - | ASME/ASTM SA/A105 |
| Low Temp | - | ASME/ASTM SA/A350 LF2 |
| Stainless Steel | - | ASME/ASTM SA/A182 F304/L, F316/L & F321/H |
| Duplex SS | - | ASME/ASTM SA/A182 F51/F60 |
| Super Duplex | - | ASME/ASTM SA/A182 F53/F55 |
| Alloy | - | ASME/ASTM SA/A182 F5, 11, 22, 91 |
| High Yield | - | ASME/ASTM SA/A694 F52, 60, 65, 70 |

## Forged Fittings

SW/NPT/BSPP/BSPT ; Boss, Bushing, Cap, Coupling (Full/Half/Reducing),
Elbow (45/90/Street), Hex Nipple.
Olet(Sockolet/Threadolet/Weldolet/Elbolet/Latrolet/Nipolet/Nipoflange),
Plug (hex/Round/Square), Swage Nipple (Con/Ecc),
Tee (Straight/Reducing/Cross), Union

1/2" - 6" ; 3000LB/6000LB/9000LB

| | | |
|---|---|---|
| Carbon Steel | - | ASME/ASTM SA/A105 |
| Low Temp | - | ASME/ASTM SA/A350 LF2 |
| Stainless Steel | - | ASME/ASTM SA/A182 F304/L, F316/L & F321/H |
| Duplex SS | - | ASME/ASTM SA/A182 F51/F60 |
| Super Duplex | - | ASME/ASTM SA/A182 F53/F55 |
| Alloy | - | ASME/ASTM SA/A182 F5, 11, 22, 91 |
| High Yield | - | ASME/ASTM SA/A694 F52, 60, 65, 70 |

## Pipes

| | | |
|---|---|---|
| Carbon Steel | - | ASME/ASTM SA/A53, SA/A106; API 5L GR B/C |
| Low Temp | - | ASME/ASTM SA/A333 GR 6 |
| Stainless Steel | - | ASME/ASTM SA/A312 TP304/L, TP316/L, TP321/H |
| Duplex SS | - | ASME/ASTM SA/A790 UNS S31803/S32205 |
| Super Duplex | - | ASME/ASTM SA/A790 UNS S32750/S32760 |
| Alloy | - | ASME/ASTM SA/A335 P5, 11, 22, 91 |
| High Yield | - | API 5L X52, 60, 65, 70 |

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# OUR SUPPLIERS

## Butt Weld Fittings

| | |
|---|---|
| The Benkan | Thailand |
| Tecnoforge | Italy |
| TaeKwang (TK) | Korea |
| SungKwang (SK) | Korea |
| Interfit | France |
| IBF | Italy |
| Erne | Austria |
| Benkan | Japan |
| Awaji (ASK) | Thailand |

## Flanges

| | |
|---|---|
| Ulma (ex-Enara) | Spain |
| Metalfar (MFF) | Italy |
| Melesi | Italy |
| Maass | Germany/USA |
| Kofco (KOF) | Korea |
| BFN (ex-Bebitz) | India |
| Bebitz | Germany |

## Forged Fittings

| | |
|---|---|
| Viar | Italy |
| Ulma | Spain |
| MEGA | Italy |
| Lame | Italy |
| IML | Italy |
| Delcorte (JD) | Italy |

## Pipes

| | |
|---|---|
| Vallourec | Brazil/China/France/Germany |
| Maruichi (ex-Kobelco) | Japan |
| ArcelorMittal | South Africa |
| Alleima (ex-Sandvik) | Sweden |

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# Company Profile

NES is an established distributor of pipes, fittings and Flange to the oil & gas, power generation and chemical industries in the Asia Pacific region. Our comprehensive inventory of more than 10,000 line items in various dimensions and material grades (like carbon steel, low alloy, high yield, stainless steel, duplex and super duplex, etc) are specially tailored to meet the most stringent requirements of major oil companies, leading engineering companies and quality-concious steel distributors.

with an inventory of more than 5,000 tonnes of high quality, fully certified materials strategically located and coupled with strong support from leading manufacturers around the world, NES is able to supply a wide range of steel products with a lead-time that matches customer's requirements. Resilient and effective supply chain management is our promise.

As an ISO 45001/9001 certified company, NES is firmly committed to provide our valued customers with our expert solutions and quality products.

Contact us:
**Sales@nasionalenergi.id**
**natasya.wijaya@nasionalenergi.id**

# StopGap Emergency Repair Kit

The StopGap Emergency Repair Kit has been designed to be installed by your competent core team to tackle emergency repairs on live through-wall leaks and wall thinning sections on pipe work subject to an appropriate risk assessment.

## A fast, effective emergency repair solution

TEAM fully understands the problems associated with low pressure leaks and their potential effects to normal plant operation.

The combination of TEAM's leak sealing and composite experience has resulted in the development of the StopGap Emergency Repair Kit – an 'all in one' solution for leak control, supplied in an easy-to-store, rectangular container.


## Features

Typically 12 layers of StopGap are all that is needed, with the specific requirements for the thickness and landing distance (overlap) clearly set out on the installation guide included.

Fast-curing epoxy putty is provided and can be used on pin hole defects, external corrosion and in conjunction with the StopGap reinforcement to strengthen lines where the clamp is not required.

In addition to the repair items, the kit also includes a blank identity tag and fixing. This enables the user to record either the unique serial number from the kit or their own identification number, thus providing an easy reference for your temporary repair register.

## Capabilities

An easy-to-fit steel repair clamp, sized to standard pipe diameters, has been designed so that live leaks can be sealed safely and reliably. It is recommended for use on Class 150 (20barg) systems, although can also perform at higher levels.

Once the clamp is in place, the kit contains all you will need to profile the closing mechanism to enable the water-activated StopGap composite reinforcement to be applied.

## Further enhancement

As the temporary repair has no defined life time the system has been developed to be compatible with our range of fully engineered composites and clamps.

This means that the repair can be upgraded to a designed lifetime solution using our engineered composite or leak sealing enclosures (clamps) subject to a design assessment or review.

Copies of the Composite Repair and Clamp Specification sheets are available on the supplied CD or from TEAM directly.

### Specification summary:

+ Easy-fit mechanical clamp seals holes up to 5mm diameter immediately
+ Recommended for service at up to 20 barg
+ Recommended maximum application temperature: 70º C.
+ Recommended maximum service temperature: 110º C
+ Repair diameters from 2" to 12"
+ Larger sizes provided upon request
+ Live repair capability

### Kit content:

+ Emergency through-wall clamp
+ Leak sealing Patch
+ StopGap rolls – quantities equate to pipe diameter
+ Stricture roll
+ Stricture perforation tool
+ Spray bottle
+ Allen key
+ Epoxy putty
+ 5 Pairs of nitrile gloves
+ Emery strip
+ Unique identity tag & fixing
+ Documentation CD – contains tutorial video, leak sealing brochure, leak sealing/composite data sheets, installation instructions & MSDS – packaged into a rectangular container (for easy storage & for use during application)

Contact us:
Sales@nasionalenergi.id
natasya.wijaya@nasionalenergi.id

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# TEAM SelfSeal® Mechanical Pipeline Repair Clamps

## Restoring Pipeline Integrity

# TEAM SelfSeal® Mechanical Pipeline Repair Clamps

## Restoring Pipeline Integrity

TEAM's range of SelfSeal mechanical pipeline repair clamps set a new standard for safety, efficiency and ease of use. Available in 1,000 psi (69 bar) and 1,500 psi (103 bar) pressure ratings, our enclosures are designed to the following specification:

+ Design and manufacture code ASME VII Div. 1
+ Carbon steel construction
+ Seal materials
    - Standard Buna-N nitrile seals -30°F TO 250°F / -34°C TO 121°C
    - Viton available on request -15°F TO 400°F / -26°C TO 205°C
+ Minimum design temperature for metal parts -20°F / -29°C
+ Designed to accommodate welding for permanent repairs
+ Enclosures can be refurbished and reused

In addition to this standard range, TEAM can respond quickly to request for customized solutions, such as:

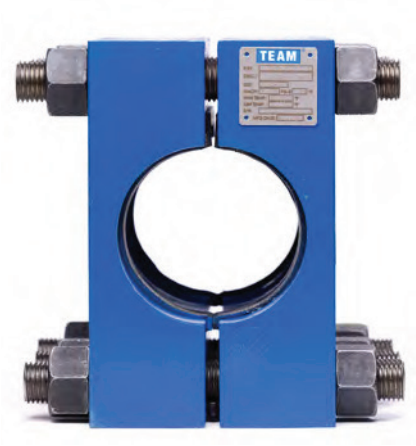
+ Larger diameters
+ Increased lengths
+ Bend, valve and flange enclosures
+ Subsea solutions (marine paint, coated fasteners and anodes)
+ Fill and vent ports

**Scan or click on QR codes to receive a quotation:**

Standard Pipeline Clamps

Custom Pipeline Clamps

**For general inquiries or custom solutions, please contact pipelineproducts@teaminc.com**




# TEAM SelfSeal Mechanical Pipeline Repair Clamps

| Nominal Pipe Size | | Inside Diameter (A) | | Inside Length Between Seals (B) | | Overall Length (C) | | Part Number 1,000 psi | Part Number 1,500 psi |
|---|---|---|---|---|---|---|---|---|---|
| (in) | (mm) | (in) | (mm) | (in) | (mm) | (in) | (mm) | | |
| 1 1/2 | 38 | 2 1/8 | 54 | 5 1/2 | 140 | 9 | 229 | 310-0150 | 315-0150 |
| 2 | 51 | 2 5/8 | 67 | 5 3/4 | 146 | 9 | 229 | 310-0200 | 315-0200 |
| 2 1/2 | 64 | 3 1/8 | 79 | 5 1/4 | 133 | 8 1/2 | 216 | 310-0250 | 315-0250 |
| 3 | 76 | 4 | 102 | 5 1/4 | 133 | 8 1/2 | 216 | 310-0300 | 315-0300 |
| 4 | 102 | 5 | 127 | 5 1/4 | 133 | 8 1/2 | 216 | 310-0400 | 315-0400 |
| 6 | 152 | 7 1/8 | 181 | 5 1/4 | 133 | 8 1/2 | 216 | 310-0600 | 315-0600 |
| 8 | 203 | 9 1/8 | 232 | 5 1/4 | 133 | 9 | 229 | 310-0800 | 315-0800 |
| 10 | 254 | 11 1/4 | 286 | 5 1/4 | 133 | 10 | 254 | 310-1000 | 315-1000 |
| 12 | 305 | 13 1/4 | 337 | 5 1/4 | 133 | 10 | 254 | 310-1200 | 315-1200 |
| 14 | 356 | 14 1/2 | 368 | 5 1/2 | 140 | 10 1/2 | 267 | 310-1400 | 315-1400 |
| 16 | 406 | 16 1/2 | 419 | 5 1/2 | 140 | 10 1/2 | 267 | 310-1600 | 315-1600 |
| 18 | 457 | 18 1/2 | 470 | 8 | 203 | 14 | 356 | 310-1800 | 315-1800 |
| 20 | 508 | 20 1/2 | 521 | 8 | 203 | 14 | 356 | 310-2000 | 315-2000 |
| 22 | 559 | 22 1/2 | 572 | 8 | 203 | 14 | 356 | 310-2200 | 315-2200 |
| 24 | 610 | 24 1/2 | 622 | 8 | 203 | 14 | 356 | 310-2400 | 315-2400 |
| 26 | 660 | 26 1/2 | 673 | 8 | 203 | 14 | 356 | 310-2600 | 315-2600 |
| 28 | 711 | 28 1/2 | 724 | 8 | 203 | 14 | 356 | 310-2800 | 315-2800 |
| 30 | 762 | 30 1/2 | 775 | 8 | 203 | 14 | 356 | 310-3000 | 315-3000 |
| 32 | 813 | 32 1/2 | 826 | 8 | 203 | 14 1/4 | 362 | 310-3200 | 315-3200 |
| 34 | 864 | 34 1/2 | 876 | 8 | 203 | 14 1/4 | 362 | 310-3400 | 315-3400 |
| 36 | 914 | 36 1/2 | 927 | 8 | 203 | 14 | 356 | 310-3600 | 315-3600 |
| 38 | 965 | 38 1/2 | 978 | 8 | 203 | 14 1/4 | 362 | 310-3800 | 315-3800 |
| 40 | 1016 | 40 1/2 | 1029 | 8 | 203 | 14 1/4 | 362 | 310-4000 | 315-4000 |
| 42 | 1067 | 42 1/2 | 1080 | 8 | 203 | 16 | 406 | 310-4200 | 315-4200 |
| 44 | 1118 | 44 1/2 | 1130 | 8 | 203 | 16 1/4 | 413 | 310-4400 | 315-4400 |
| 46 | 1168 | 46 1/2 | 1181 | 8 | 203 | 16 1/4 | 413 | 310-4600 | 315-4600 |
| 48 | 1219 | 48 1/2 | 1232 | 8 | 203 | 16 1/4 | 413 | 310-4800 | 315-4800 |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# Welded Pipeline Sleeves Catalog

# Welded Pipeline Sleeves

## Code Compliant Repairs to Damaged Pipeline Assets

Designed in accordance with ASME PCC-2 with ratings derived using ASME B31.8, TEAM's range of welded type B repair sleeves are designed and manufactured to provide cost effective code compliant repairs for a wide range of pipeline damage mechanisms. Including:

- Internal corrosion/erosion
- External corrosion
- Mechanical damage such as dents and gouges
- Cracking

Welded sleeves have long been the go-to technology for pipeline damage due to the wealth of positive operating history and well-codified design and installation guidance.

TEAM's range of Type B welded sleeve repairs provides the ultimate ordering flexibility with a wide range of pipeline diameters, location classes and repair lengths covered with a simple ordering system.

TEAM welded pipeline are designed and manufactured to the following standard specification and options:

- Materials of 50, 52, 65 and 70ksi yield stress
- Up to 10' length (3/4" thick and above available up to 5')
- Wide range of standard thicknesses
- 16ga backing strips
- Optional milled groove to accept backing strips
- 30º longitudinal bevel
- Flat end faces

TEAM's welded pipeline sleeves can be ordered directly if the required sleeve wall thickness is known. Otherwise, TEAM's standard rating tables can be used to evaluate the required thickness (tables available for review at back of catalog).

Integrated in-house capabilities enable TEAM to carry out turn-key installation of welded sleeves including in-service welding and non-destructive testing. This turn-key approach ensures that projects are executed to the highest safety and quality standards, with zero hand-offs and a single PO.

**Scan or click on QR codes to receive a quotation:**

Click or scan if sleeve thickness is known

Click or scan for TEAM to calculate sleeve thickness

For general inquiries or custom solutions, please contact pipelineproducts@teaminc.com

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## Sleeve Ordering Information – By Part Number

TEAM's welded sleeves can be ordered using the below standard part numbering system. The standard, most cost-effective selection is highlighted in bold:

| TWS- | 65 - | 8 - | 0.375 - | 6 - | NG - | P |
|---|---|---|---|---|---|---|

- TEAM Welded Sleeve
- Sleeve SMYS (ksi)
  50, 52*, 65, 70*
- Pipeline Diameter
  6 thru 36
- Welded Sleeve Thickness
  0.25, 0.3125, 0.375, 0.5, 0.625, 0.75
- Full Encirclement Sleeve Length (feet, 1' Steps)
  For sleeves up to 5/8" thick 1' to 10'
  For sleeves 3/4" and above 1' to 5'
- Backing Strip Groove
  NG = No Groove, G = 1/16" milled groove
- Coating
  P = Red Oxide Primer, NC = No Coating

*Sleeves with SMYS 52 and 70 ksi are supplied by selecting ASTM A572 Gr 50 & 65 materials with adequate tensile properties to meet the higher yield designation.

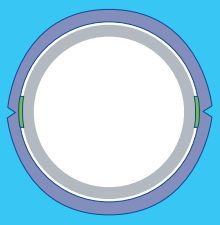
Specific material properties over standard ASTM A572 must be communicated including, carbon equivalent, impact test temperature and energy, hardness or any other specific requirements.

For practicality of manufacture, the below table provides guidance on the maximum sleeve thickness by pipeline diameter for TEAM's standard sleeves. Thicker sizes may be accommodated by special request:

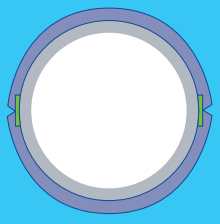
| Nominal Pipeline Size | 2"+ | 6" + | 12"+ | 16"+ | 24"+ |
|---|---|---|---|---|---|
| Maximum Sleeve Thickness | ¼" | 3/8" | ½" | 5/8" | ¾" |

## Backing Strip Grooves:

TEAM's welded sleeves can be furnished with or without grooves to house the backing strips. Backing strip grooves may be a client preference and assist in installation. The groove reduces the effective wall thickness and hence the pressure capability of the sleeve a small amount. The diagrams bellow illustrate the backing strip groove options:



Sleeve with no backing strip groove



Sleeve with backing strip groove

## Ordering Example:

TWS-65-16-0.625-8-G-NC represents 65ksi sleeve for a 16" pipeline that is 5/8" thick and 8' long with backing strip grooves and no coating.

### Pressure Rating Tables

Sleeve allowable pressure is evaluated using ASME B31.8 841.1.1 & ASME PCC-2 Article 206.

$$P = \frac{2St}{D} FET$$

**Where:**

D = Outside diameter of sleeve (in)

E = Longitudinal joint factor
(1.0 for full volumetric inspection or 0.8 otherwise as per ASME PCC-2 206-3.2)

F = Design factor ASME B31.8 Table 841.1.6-1

P = Design pressure (psi)

S = Specified minimum yield stress of sleeve (psi)

T = Temperature derating factor
(1.0 for design temperatures 250ºF or lower)

t = Sleeve thickness (for sleeves with backing strip grooves the section is reduced by the groove depth giving a lower allowable pressure)

**The tables that follow at the back of this catalog illustrate the maximum allowable pressure for each option of TEAM's welded sleeve.**

# Rating Table for TEAM Type B Welded Sleeve

## 50ksi Material, 0.8 Longitudinal Weld Joint Efficiency (MT/PT), 250ºF Maximum Design Temperature

| Pipe NPS | 1/4 | | | | | | | | | | 5/16 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 4 | 1,499 | 287 | 1,873 | 359 | 2,248 | 431 | 2,697 | 517 | 2,997 | 574 | | | | | | | | | | | |
| 6 | 1,059 | 383 | 1,324 | 479 | 1,589 | 575 | 1,907 | 690 | 2,119 | 766 | 1,313 | 716 | 1,641 | 894 | 1,969 | 1,073 | 2,363 | 1,288 | 2,625 | 1,431 | |
| 8 | 830 | 373 | 1,038 | 467 | 1,245 | 560 | 1,494 | 672 | 1,661 | 747 | 1,033 | 635 | 1,291 | 794 | 1,549 | 953 | 1,859 | 1,143 | 2,065 | 1,270 | |
| 10 | 675 | 344 | 844 | 430 | 1,013 | 516 | 1,215 | 619 | 1,350 | 688 | 842 | 557 | 1,052 | 697 | 1,263 | 836 | 1,515 | 1,003 | 1,683 | 1,115 | |
| 12 | 574 | 314 | 718 | 393 | 861 | 472 | 1,034 | 566 | 1,148 | 629 | 717 | 495 | 896 | 619 | 1,076 | 742 | 1,291 | 891 | 1,434 | 990 | |
| 14 | 525 | 297 | 656 | 372 | 788 | 446 | 945 | 535 | 1,050 | 595 | 656 | 453 | 820 | 566 | 984 | 679 | 1,181 | 815 | 1,313 | 906 | |
| 16 | 462 | 273 | 577 | 341 | 693 | 409 | 832 | 491 | 924 | 545 | 578 | 399 | 722 | 499 | 867 | 598 | 1,040 | 718 | 1,156 | 798 | |
| 18 | 412 | 251 | 515 | 314 | 619 | 377 | 742 | 452 | 825 | 502 | 516 | 356 | 645 | 445 | 774 | 534 | 929 | 641 | 1,033 | 713 | |
| 20 | 372 | 227 | 465 | 284 | 559 | 340 | 670 | 408 | 745 | 454 | 467 | 322 | 583 | 402 | 700 | 483 | 840 | 579 | 933 | 644 | **Sleeve MAOP** |
| 22 | 339 | 207 | 424 | 259 | 509 | 310 | 611 | 372 | 679 | 414 | 425 | 294 | 532 | 367 | 638 | 440 | 766 | 529 | 851 | 587 | |
| 24 | 312 | 190 | 390 | 238 | 468 | 285 | 561 | 342 | 624 | 380 | 391 | 270 | 489 | 337 | 587 | 405 | 704 | 486 | 782 | 540 | |
| 26 | 288 | 176 | 361 | 220 | 433 | 264 | 519 | 316 | 577 | 352 | 362 | 250 | 452 | 312 | 543 | 375 | 651 | 449 | 724 | 499 | |
| 28 | 268 | 163 | 335 | 204 | 402 | 245 | 483 | 294 | 537 | 327 | 337 | 232 | 421 | 290 | 505 | 349 | 606 | 418 | 673 | 465 | |
| 30 | 251 | 153 | 313 | 191 | 376 | 229 | 451 | 275 | 502 | 306 | 315 | 217 | 393 | 272 | 472 | 326 | 567 | 391 | 630 | 434 | |
| 32 | 235 | 143 | 294 | 179 | 353 | 215 | 424 | 258 | 471 | 287 | 296 | 204 | 369 | 255 | 443 | 306 | 532 | 367 | 591 | 408 | |
| 34 | 222 | 135 | 277 | 169 | 333 | 203 | 399 | 243 | 444 | 270 | 279 | 192 | 348 | 240 | 418 | 288 | 501 | 346 | 557 | 384 | |
| 36 | 210 | 128 | 262 | 160 | 315 | 192 | 377 | 230 | 419 | 256 | 263 | 182 | 329 | 227 | 395 | 273 | 474 | 327 | 527 | 364 | |

| Pipe NPS | 3/8 | | | | | | | | | | 1/2 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 6 | 1,557 | 1,037 | 1,947 | 1,296 | 2,336 | 1,556 | 2,803 | 1,867 | 3,115 | 2,074 | | | | | | | | | | | |
| 8 | 1,229 | 890 | 1,537 | 1,112 | 1,844 | 1,335 | 2,213 | 1,602 | 2,459 | 1,780 | | | | | | | | | | | |
| 10 | 1,005 | 747 | 1,256 | 933 | 1,507 | 1,120 | 1,809 | 1,344 | 2,009 | 1,493 | | | | | | | | | | | |
| 12 | 857 | 637 | 1,072 | 796 | 1,286 | 956 | 1,543 | 1,147 | 1,714 | 1,274 | 1,130 | 914 | 1,413 | 1,142 | 1,695 | 1,371 | 2,034 | 1,645 | 2,260 | 1,828 | |
| 14 | 785 | 584 | 982 | 729 | 1,178 | 875 | 1,413 | 1,050 | 1,570 | 1,167 | 1,037 | 838 | 1,296 | 1,048 | 1,555 | 1,258 | 1,866 | 1,509 | 2,073 | 1,677 | |
| 16 | 692 | 514 | 865 | 643 | 1,038 | 772 | 1,246 | 926 | 1,384 | 1,029 | 916 | 740 | 1,145 | 926 | 1,373 | 1,111 | 1,648 | 1,333 | 1,831 | 1,481 | |
| 18 | 619 | 460 | 774 | 575 | 928 | 690 | 1,114 | 828 | 1,238 | 920 | 820 | 663 | 1,025 | 829 | 1,230 | 995 | 1,476 | 1,193 | 1,640 | 1,326 | |
| 20 | 560 | 416 | 699 | 520 | 839 | 624 | 1,007 | 748 | 1,119 | 832 | 742 | 600 | 928 | 750 | 1,113 | 900 | 1,336 | 1,080 | 1,484 | 1,200 | **Sleeve MAOP** |
| 22 | 511 | 379 | 638 | 474 | 766 | 569 | 919 | 683 | 1,021 | 759 | 678 | 548 | 848 | 685 | 1,017 | 822 | 1,220 | 987 | 1,356 | 1,097 | |
| 24 | 470 | 349 | 587 | 436 | 704 | 523 | 845 | 628 | 939 | 698 | 624 | 505 | 780 | 631 | 936 | 757 | 1,123 | 908 | 1,248 | 1,009 | |
| 26 | 435 | 323 | 543 | 404 | 652 | 484 | 782 | 581 | 869 | 646 | 578 | 467 | 723 | 584 | 867 | 701 | 1,041 | 841 | 1,156 | 935 | |
| 28 | 405 | 301 | 506 | 376 | 607 | 451 | 728 | 541 | 809 | 601 | 538 | 435 | 673 | 544 | 808 | 653 | 969 | 784 | 1,077 | 871 | |
| 30 | 378 | 281 | 473 | 351 | 567 | 422 | 681 | 506 | 757 | 562 | 504 | 407 | 630 | 509 | 756 | 611 | 907 | 733 | 1,008 | 815 | |
| 32 | 355 | 264 | 444 | 330 | 533 | 396 | 640 | 475 | 711 | 528 | 473 | 383 | 592 | 478 | 710 | 574 | 852 | 689 | 947 | 766 | |
| 34 | 335 | 249 | 419 | 311 | 502 | 373 | 603 | 448 | 670 | 498 | 446 | 361 | 558 | 451 | 670 | 541 | 804 | 650 | 893 | 722 | |
| 36 | 317 | 235 | 396 | 294 | 475 | 353 | 570 | 424 | 633 | 471 | 422 | 342 | 528 | 427 | 634 | 512 | 760 | 615 | 845 | 683 | |

| Pipe NPS | 5/8 | | | | | | | | | | 3/4 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 16 | 1,133 | 960 | 1,416 | 1,200 | 1,699 | 1,440 | 2,039 | 1,728 | 2,265 | 1,920 | | | | | | | | | | | |
| 18 | 1,016 | 861 | 1,270 | 1,076 | 1,524 | 1,291 | 1,828 | 1,550 | 2,031 | 1,722 | | | | | | | | | | | |
| 20 | 921 | 780 | 1,151 | 975 | 1,381 | 1,171 | 1,657 | 1,405 | 1,841 | 1,561 | | | | | | | | | | | |
| 22 | 842 | 714 | 1,052 | 892 | 1,263 | 1,070 | 1,515 | 1,284 | 1,684 | 1,427 | | | | | | | | | | | |
| 24 | 776 | 657 | 969 | 822 | 1,163 | 986 | 1,396 | 1,183 | 1,551 | 1,315 | 924 | 807 | 1,155 | 1,009 | 1,386 | 1,211 | 1,663 | 1,453 | 1,848 | 1,614 | |
| 26 | 719 | 609 | 899 | 762 | 1,078 | 914 | 1,294 | 1,097 | 1,438 | 1,219 | 857 | 749 | 1,071 | 936 | 1,286 | 1,123 | 1,543 | 1,347 | 1,714 | 1,497 | **Sleeve MAOP** |
| 28 | 670 | 568 | 837 | 710 | 1,005 | 852 | 1,206 | 1,022 | 1,340 | 1,136 | 799 | 698 | 999 | 873 | 1,199 | 1,047 | 1,439 | 1,257 | 1,599 | 1,396 | |
| 30 | 627 | 532 | 784 | 665 | 941 | 797 | 1,129 | 957 | 1,255 | 1,063 | 749 | 654 | 936 | 817 | 1,123 | 981 | 1,348 | 1,177 | 1,498 | 1,308 | |
| 32 | 590 | 500 | 737 | 625 | 884 | 750 | 1,061 | 900 | 1,179 | 1,000 | 704 | 615 | 880 | 769 | 1,056 | 923 | 1,268 | 1,107 | 1,408 | 1,230 | |
| 34 | 556 | 472 | 695 | 589 | 834 | 707 | 1,001 | 849 | 1,113 | 943 | 665 | 580 | 831 | 726 | 997 | 871 | 1,196 | 1,045 | 1,329 | 1,161 | |
| 36 | 527 | 446 | 658 | 558 | 790 | 669 | 948 | 803 | 1,053 | 893 | 629 | 550 | 787 | 687 | 944 | 824 | 1,133 | 989 | 1,259 | 1,099 | |

# Rating Table for TEAM Type B Welded Sleeve

## 52ksi Material, 0.8 Longitudinal Weld Joint Efficiency (MT/PT), 250ºF Maximum Design Temperature

| Pipe NPS | 1/4 | | | | | | | | | | 5/16 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 4 | 1,558 | 299 | 1,948 | 373 | 2,338 | 448 | 2,805 | 537 | 3,117 | 597 | | | | | | | | | | | Sleeve MAOP |
| 6 | 1,102 | 398 | 1,377 | 498 | 1,653 | 598 | 1,983 | 717 | 2,203 | 797 | 1,365 | 744 | 1,706 | 930 | 2,048 | 1,116 | 2,457 | 1,340 | 2,730 | 1,488 | |
| 8 | 863 | 388 | 1,079 | 486 | 1,295 | 583 | 1,554 | 699 | 1,727 | 777 | 1,074 | 661 | 1,342 | 826 | 1,611 | 991 | 1,933 | 1,189 | 2,148 | 1,321 | |
| 10 | 702 | 358 | 878 | 447 | 1,053 | 536 | 1,264 | 644 | 1,404 | 715 | 875 | 580 | 1,094 | 725 | 1,313 | 870 | 1,576 | 1,043 | 1,751 | 1,159 | |
| 12 | 597 | 327 | 746 | 409 | 896 | 490 | 1,075 | 589 | 1,194 | 654 | 746 | 515 | 932 | 643 | 1,119 | 772 | 1,342 | 926 | 1,491 | 1,029 | |
| 14 | 546 | 309 | 683 | 387 | 819 | 464 | 983 | 557 | 1,092 | 618 | 683 | 471 | 853 | 589 | 1,024 | 706 | 1,229 | 848 | 1,365 | 942 | |
| 16 | 480 | 283 | 601 | 354 | 721 | 425 | 865 | 510 | 961 | 567 | 601 | 415 | 751 | 518 | 902 | 622 | 1,082 | 747 | 1,202 | 830 | |
| 18 | 429 | 261 | 536 | 326 | 643 | 392 | 772 | 470 | 858 | 522 | 537 | 371 | 671 | 463 | 805 | 556 | 966 | 667 | 1,074 | 741 | |
| 20 | 387 | 236 | 484 | 295 | 581 | 354 | 697 | 425 | 775 | 472 | 485 | 335 | 606 | 419 | 728 | 502 | 873 | 603 | 970 | 670 | |
| 22 | 353 | 215 | 441 | 269 | 530 | 323 | 635 | 387 | 706 | 430 | 443 | 305 | 553 | 382 | 664 | 458 | 797 | 550 | 885 | 611 | |
| 24 | 324 | 198 | 405 | 247 | 487 | 296 | 584 | 356 | 649 | 395 | 407 | 281 | 508 | 351 | 610 | 421 | 732 | 505 | 814 | 561 | |
| 26 | 300 | 183 | 375 | 229 | 450 | 274 | 540 | 329 | 600 | 366 | 376 | 260 | 470 | 325 | 565 | 390 | 677 | 467 | 753 | 519 | |
| 28 | 279 | 170 | 349 | 213 | 419 | 255 | 502 | 306 | 558 | 340 | 350 | 242 | 438 | 302 | 525 | 362 | 630 | 435 | 700 | 483 | |
| 30 | 261 | 159 | 326 | 199 | 391 | 238 | 469 | 286 | 522 | 318 | 327 | 226 | 409 | 282 | 491 | 339 | 589 | 407 | 655 | 452 | |
| 32 | 245 | 149 | 306 | 186 | 367 | 224 | 441 | 269 | 490 | 298 | 307 | 212 | 384 | 265 | 461 | 318 | 553 | 382 | 615 | 424 | |
| 34 | 231 | 141 | 288 | 176 | 346 | 211 | 415 | 253 | 461 | 281 | 290 | 200 | 362 | 250 | 435 | 300 | 521 | 360 | 579 | 400 | |
| 36 | 218 | 133 | 273 | 166 | 327 | 199 | 393 | 239 | 436 | 266 | 274 | 189 | 342 | 236 | 411 | 284 | 493 | 340 | 548 | 378 | |

| Pipe NPS | 3/8 | | | | | | | | | | 1/2 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 6 | 1,620 | 1,078 | 2,025 | 1,348 | 2,429 | 1,618 | 2,915 | 1,941 | 3,239 | 2,157 | | | | | | | | | | | Sleeve MAOP |
| 8 | 1,279 | 926 | 1,598 | 1,157 | 1,918 | 1,388 | 2,302 | 1,666 | 2,557 | 1,851 | | | | | | | | | | | |
| 10 | 1,045 | 777 | 1,306 | 971 | 1,567 | 1,165 | 1,881 | 1,398 | 2,090 | 1,553 | | | | | | | | | | | |
| 12 | 892 | 663 | 1,114 | 828 | 1,337 | 994 | 1,605 | 1,193 | 1,783 | 1,325 | 1,175 | 950 | 1,469 | 1,188 | 1,763 | 1,426 | 2,116 | 1,711 | 2,351 | 1,901 | |
| 14 | 817 | 607 | 1,021 | 759 | 1,225 | 910 | 1,470 | 1,092 | 1,633 | 1,214 | 1,078 | 872 | 1,348 | 1,090 | 1,617 | 1,308 | 1,941 | 1,569 | 2,156 | 1,744 | |
| 16 | 720 | 535 | 900 | 669 | 1,080 | 802 | 1,296 | 963 | 1,440 | 1,070 | 952 | 770 | 1,190 | 963 | 1,428 | 1,155 | 1,714 | 1,386 | 1,904 | 1,540 | |
| 18 | 644 | 478 | 804 | 598 | 965 | 717 | 1,158 | 861 | 1,287 | 957 | 853 | 690 | 1,066 | 862 | 1,279 | 1,034 | 1,535 | 1,241 | 1,705 | 1,379 | |
| 20 | 582 | 432 | 727 | 541 | 873 | 649 | 1,047 | 778 | 1,164 | 865 | 772 | 624 | 965 | 780 | 1,158 | 936 | 1,389 | 1,124 | 1,544 | 1,248 | |
| 22 | 531 | 395 | 664 | 493 | 797 | 592 | 956 | 710 | 1,062 | 789 | 705 | 570 | 881 | 713 | 1,058 | 855 | 1,269 | 1,026 | 1,410 | 1,141 | |
| 24 | 488 | 363 | 610 | 454 | 732 | 544 | 879 | 653 | 977 | 726 | 649 | 525 | 811 | 656 | 974 | 787 | 1,168 | 945 | 1,298 | 1,050 | |
| 26 | 452 | 336 | 565 | 420 | 678 | 504 | 814 | 605 | 904 | 672 | 601 | 486 | 751 | 608 | 902 | 729 | 1,082 | 875 | 1,202 | 972 | |
| 28 | 421 | 313 | 526 | 391 | 631 | 469 | 757 | 563 | 841 | 625 | 560 | 453 | 700 | 566 | 840 | 679 | 1,008 | 815 | 1,120 | 906 | |
| 30 | 393 | 292 | 492 | 365 | 590 | 439 | 708 | 526 | 787 | 585 | 524 | 424 | 655 | 530 | 786 | 636 | 943 | 763 | 1,048 | 847 | |
| 32 | 369 | 275 | 462 | 343 | 554 | 412 | 665 | 494 | 739 | 549 | 492 | 398 | 615 | 498 | 738 | 597 | 886 | 717 | 985 | 796 | |
| 34 | 348 | 259 | 435 | 324 | 522 | 388 | 627 | 466 | 697 | 518 | 464 | 375 | 580 | 469 | 696 | 563 | 836 | 676 | 929 | 751 | |
| 36 | 329 | 245 | 412 | 306 | 494 | 367 | 593 | 441 | 659 | 490 | 439 | 355 | 549 | 444 | 659 | 533 | 791 | 639 | 879 | 710 | |

| Pipe NPS | 5/8 | | | | | | | | | | 3/4 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 16 | 1,178 | 998 | 1,472 | 1,248 | 1,767 | 1,498 | 2,120 | 1,797 | 2,356 | 1,997 | | | | | | | | | | | Sleeve MAOP |
| 18 | 1,056 | 895 | 1,320 | 1,119 | 1,585 | 1,343 | 1,901 | 1,612 | 2,113 | 1,791 | | | | | | | | | | | |
| 20 | 958 | 812 | 1,197 | 1,014 | 1,436 | 1,217 | 1,724 | 1,461 | 1,915 | 1,623 | | | | | | | | | | | |
| 22 | 876 | 742 | 1,095 | 928 | 1,313 | 1,113 | 1,576 | 1,336 | 1,751 | 1,484 | | | | | | | | | | | |
| 24 | 807 | 684 | 1,008 | 855 | 1,210 | 1,025 | 1,452 | 1,231 | 1,613 | 1,367 | 961 | 839 | 1,201 | 1,049 | 1,442 | 1,259 | 1,730 | 1,511 | 1,922 | 1,679 | |
| 26 | 748 | 634 | 935 | 792 | 1,121 | 951 | 1,346 | 1,141 | 1,495 | 1,267 | 891 | 779 | 1,114 | 973 | 1,337 | 1,168 | 1,605 | 1,401 | 1,783 | 1,557 | |
| 28 | 697 | 591 | 871 | 738 | 1,045 | 886 | 1,254 | 1,063 | 1,394 | 1,181 | 831 | 726 | 1,039 | 907 | 1,247 | 1,089 | 1,496 | 1,307 | 1,663 | 1,452 | |
| 30 | 652 | 553 | 815 | 691 | 979 | 829 | 1,174 | 995 | 1,305 | 1,106 | 779 | 680 | 973 | 850 | 1,168 | 1,020 | 1,402 | 1,224 | 1,557 | 1,360 | |
| 32 | 613 | 520 | 767 | 650 | 920 | 780 | 1,104 | 936 | 1,226 | 1,040 | 732 | 640 | 916 | 800 | 1,099 | 959 | 1,318 | 1,151 | 1,465 | 1,279 | |
| 34 | 579 | 490 | 723 | 613 | 868 | 736 | 1,041 | 883 | 1,157 | 981 | 691 | 604 | 864 | 755 | 1,037 | 906 | 1,244 | 1,087 | 1,383 | 1,207 | |
| 36 | 548 | 464 | 685 | 580 | 821 | 696 | 986 | 835 | 1,095 | 928 | 655 | 572 | 818 | 715 | 982 | 857 | 1,178 | 1,029 | 1,309 | 1,143 | |

# Rating Table for TEAM Type B Welded Sleeve

## 65ksi Material, 0.8 Longitudinal Weld Joint Efficiency (MT/PT), 250ºF Maximum Design Temperature

| Pipe NPS | 1/4 | | | | | | | | | | 5/16 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 4 | 1,948 | 373 | 2,435 | 467 | 2,922 | 560 | 3,507 | 672 | 3,896 | 746 | | | | | | | | | | | |
| 6 | 1,377 | 498 | 1,721 | 623 | 2,066 | 747 | 2,479 | 896 | 2,754 | 996 | 1,706 | 930 | 2,133 | 1,163 | 2,559 | 1,395 | 3,071 | 1,675 | 3,413 | 1,861 | |
| 8 | 1,079 | 486 | 1,349 | 607 | 1,619 | 728 | 1,943 | 874 | 2,159 | 971 | 1,342 | 826 | 1,678 | 1,032 | 2,013 | 1,239 | 2,416 | 1,486 | 2,685 | 1,651 | |
| 10 | 878 | 447 | 1,097 | 559 | 1,317 | 670 | 1,580 | 804 | 1,755 | 894 | 1,094 | 725 | 1,368 | 906 | 1,641 | 1,087 | 1,970 | 1,304 | 2,189 | 1,449 | |
| 12 | 746 | 409 | 933 | 511 | 1,120 | 613 | 1,344 | 736 | 1,493 | 817 | 932 | 643 | 1,165 | 804 | 1,398 | 965 | 1,678 | 1,158 | 1,864 | 1,287 | |
| 14 | 683 | 387 | 853 | 483 | 1,024 | 580 | 1,229 | 696 | 1,365 | 773 | 853 | 589 | 1,066 | 736 | 1,280 | 883 | 1,536 | 1,060 | 1,706 | 1,177 | |
| 16 | 601 | 354 | 751 | 443 | 901 | 532 | 1,081 | 638 | 1,201 | 709 | 751 | 518 | 939 | 648 | 1,127 | 778 | 1,352 | 933 | 1,503 | 1,037 | |
| 18 | 536 | 326 | 670 | 408 | 804 | 489 | 965 | 587 | 1,072 | 653 | 671 | 463 | 839 | 579 | 1,007 | 695 | 1,208 | 834 | 1,342 | 926 | |
| 20 | 484 | 295 | 605 | 369 | 726 | 442 | 871 | 531 | 968 | 590 | 606 | 419 | 758 | 523 | 910 | 628 | 1,092 | 753 | 1,213 | 837 | **Sleeve MAOP** |
| 22 | 441 | 269 | 552 | 336 | 662 | 403 | 794 | 484 | 883 | 538 | 553 | 382 | 691 | 477 | 830 | 573 | 996 | 687 | 1,106 | 763 | |
| 24 | 405 | 247 | 507 | 309 | 608 | 371 | 730 | 445 | 811 | 494 | 508 | 351 | 636 | 439 | 763 | 526 | 915 | 632 | 1,017 | 702 | |
| 26 | 375 | 229 | 469 | 286 | 562 | 343 | 675 | 411 | 750 | 457 | 470 | 325 | 588 | 406 | 706 | 487 | 847 | 584 | 941 | 649 | |
| 28 | 349 | 213 | 436 | 266 | 523 | 319 | 628 | 383 | 698 | 425 | 438 | 302 | 547 | 378 | 657 | 453 | 788 | 544 | 875 | 604 | |
| 30 | 326 | 199 | 408 | 248 | 489 | 298 | 587 | 358 | 652 | 397 | 409 | 282 | 512 | 353 | 614 | 424 | 737 | 508 | 818 | 565 | |
| 32 | 306 | 186 | 383 | 233 | 459 | 280 | 551 | 336 | 612 | 373 | 384 | 265 | 480 | 331 | 576 | 398 | 692 | 477 | 768 | 530 | |
| 34 | 288 | 176 | 360 | 220 | 433 | 264 | 519 | 316 | 577 | 351 | 362 | 250 | 453 | 312 | 543 | 375 | 652 | 450 | 724 | 500 | |
| 36 | 273 | 166 | 341 | 208 | 409 | 249 | 491 | 299 | 545 | 332 | 342 | 236 | 428 | 295 | 514 | 354 | 616 | 425 | 685 | 473 | |

| Pipe NPS | 3/8 | | | | | | | | | | 1/2 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 6 | 2,025 | 1,348 | 2,531 | 1,685 | 3,037 | 2,022 | 3,644 | 2,427 | 4,049 | 2,696 | | | | | | | | | | | |
| 8 | 1,598 | 1,157 | 1,998 | 1,446 | 2,397 | 1,735 | 2,877 | 2,083 | 3,197 | 2,314 | | | | | | | | | | | |
| 10 | 1,306 | 971 | 1,633 | 1,213 | 1,959 | 1,456 | 2,351 | 1,747 | 2,612 | 1,941 | | | | | | | | | | | |
| 12 | 1,114 | 828 | 1,393 | 1,035 | 1,672 | 1,242 | 2,006 | 1,491 | 2,229 | 1,656 | 1,469 | 1,188 | 1,836 | 1,485 | 2,204 | 1,782 | 2,644 | 2,138 | 2,938 | 2,376 | |
| 14 | 1,021 | 759 | 1,276 | 948 | 1,531 | 1,138 | 1,837 | 1,365 | 2,042 | 1,517 | 1,348 | 1,090 | 1,685 | 1,362 | 2,022 | 1,635 | 2,426 | 1,962 | 2,695 | 2,180 | |
| 16 | 900 | 669 | 1,125 | 836 | 1,350 | 1,003 | 1,620 | 1,204 | 1,800 | 1,337 | 1,190 | 963 | 1,488 | 1,203 | 1,785 | 1,444 | 2,143 | 1,733 | 2,381 | 1,925 | |
| 18 | 804 | 598 | 1,006 | 747 | 1,207 | 897 | 1,448 | 1,076 | 1,609 | 1,196 | 1,066 | 862 | 1,332 | 1,077 | 1,599 | 1,293 | 1,918 | 1,551 | 2,132 | 1,724 | |
| 20 | 727 | 541 | 909 | 676 | 1,091 | 811 | 1,309 | 973 | 1,455 | 1,081 | 965 | 780 | 1,206 | 975 | 1,447 | 1,170 | 1,737 | 1,405 | 1,930 | 1,561 | **Sleeve MAOP** |
| 22 | 664 | 493 | 830 | 617 | 996 | 740 | 1,195 | 888 | 1,328 | 987 | 881 | 713 | 1,102 | 891 | 1,322 | 1,069 | 1,587 | 1,283 | 1,763 | 1,426 | |
| 24 | 610 | 454 | 763 | 567 | 916 | 680 | 1,099 | 817 | 1,221 | 907 | 811 | 656 | 1,014 | 820 | 1,217 | 984 | 1,460 | 1,181 | 1,623 | 1,312 | |
| 26 | 565 | 420 | 706 | 525 | 847 | 630 | 1,017 | 756 | 1,130 | 840 | 751 | 608 | 939 | 760 | 1,127 | 912 | 1,353 | 1,094 | 1,503 | 1,215 | |
| 28 | 526 | 391 | 657 | 488 | 789 | 586 | 947 | 703 | 1,052 | 782 | 700 | 566 | 875 | 707 | 1,050 | 849 | 1,260 | 1,019 | 1,400 | 1,132 | |
| 30 | 492 | 365 | 615 | 457 | 738 | 548 | 885 | 658 | 984 | 731 | 655 | 530 | 819 | 662 | 982 | 794 | 1,179 | 953 | 1,310 | 1,059 | |
| 32 | 462 | 343 | 577 | 429 | 693 | 515 | 831 | 618 | 924 | 686 | 615 | 498 | 769 | 622 | 923 | 746 | 1,108 | 896 | 1,231 | 995 | |
| 34 | 435 | 324 | 544 | 404 | 653 | 485 | 784 | 582 | 871 | 647 | 580 | 469 | 725 | 587 | 870 | 704 | 1,045 | 845 | 1,161 | 939 | |
| 36 | 412 | 306 | 515 | 383 | 618 | 459 | 741 | 551 | 824 | 612 | 549 | 444 | 686 | 555 | 824 | 666 | 988 | 799 | 1,098 | 888 | |

| Pipe NPS | 5/8 | | | | | | | | | | 3/4 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 16 | 1,472 | 1,248 | 1,841 | 1,560 | 2,209 | 1,872 | 2,650 | 2,246 | 2,945 | 2,496 | | | | | | | | | | | |
| 18 | 1,320 | 1,119 | 1,651 | 1,399 | 1,981 | 1,679 | 2,377 | 2,015 | 2,641 | 2,238 | | | | | | | | | | | |
| 20 | 1,197 | 1,014 | 1,496 | 1,268 | 1,795 | 1,522 | 2,154 | 1,826 | 2,394 | 2,029 | | | | | | | | | | | |
| 22 | 1,095 | 928 | 1,368 | 1,160 | 1,642 | 1,391 | 1,970 | 1,670 | 2,189 | 1,855 | | | | | | | | | | | |
| 24 | 1,008 | 855 | 1,260 | 1,068 | 1,512 | 1,282 | 1,815 | 1,538 | 2,016 | 1,709 | 1,201 | 1,049 | 1,502 | 1,311 | 1,802 | 1,574 | 2,162 | 1,888 | 2,403 | 2,098 | |
| 26 | 935 | 792 | 1,168 | 990 | 1,402 | 1,188 | 1,682 | 1,426 | 1,869 | 1,584 | 1,114 | 973 | 1,393 | 1,216 | 1,672 | 1,460 | 2,006 | 1,752 | 2,229 | 1,946 | **Sleeve MAOP** |
| 28 | 871 | 738 | 1,089 | 923 | 1,306 | 1,107 | 1,568 | 1,329 | 1,742 | 1,476 | 1,039 | 907 | 1,299 | 1,134 | 1,559 | 1,361 | 1,870 | 1,633 | 2,078 | 1,815 | |
| 30 | 815 | 691 | 1,019 | 864 | 1,223 | 1,037 | 1,468 | 1,244 | 1,631 | 1,382 | 973 | 850 | 1,217 | 1,063 | 1,460 | 1,275 | 1,752 | 1,530 | 1,947 | 1,700 | |
| 32 | 767 | 650 | 958 | 812 | 1,150 | 975 | 1,380 | 1,169 | 1,533 | 1,299 | 916 | 800 | 1,144 | 999 | 1,373 | 1,199 | 1,648 | 1,439 | 1,831 | 1,599 | |
| 34 | 723 | 613 | 904 | 766 | 1,085 | 919 | 1,302 | 1,103 | 1,446 | 1,226 | 864 | 755 | 1,080 | 943 | 1,296 | 1,132 | 1,555 | 1,358 | 1,728 | 1,509 | |
| 36 | 685 | 580 | 856 | 725 | 1,027 | 870 | 1,232 | 1,044 | 1,369 | 1,160 | 818 | 715 | 1,023 | 893 | 1,227 | 1,072 | 1,473 | 1,286 | 1,636 | 1,429 | |

# Rating Table for TEAM Type B Welded Sleeve

## 70ksi Material, 0.8 Longitudinal Weld Joint Efficiency (MT/PT), 250ºF Maximum Design Temperature

| Pipe NPS | 1/4 | | | | | | | | | | 5/16 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 4 | 2,098 | 402 | 2,622 | 502 | 3,147 | 603 | 3,776 | 724 | 4,196 | 804 | | | | | | | | | | | |
| 6 | 1,483 | 536 | 1,854 | 670 | 2,225 | 805 | 2,669 | 965 | 2,966 | 1,073 | 1,838 | 1,002 | 2,297 | 1,252 | 2,756 | 1,503 | 3,308 | 1,803 | 3,675 | 2,004 | |
| 8 | 1,162 | 523 | 1,453 | 654 | 1,744 | 784 | 2,092 | 941 | 2,325 | 1,046 | 1,446 | 889 | 1,807 | 1,112 | 2,168 | 1,334 | 2,602 | 1,601 | 2,891 | 1,778 | |
| 10 | 945 | 481 | 1,182 | 602 | 1,418 | 722 | 1,701 | 866 | 1,890 | 963 | 1,178 | 780 | 1,473 | 975 | 1,768 | 1,171 | 2,121 | 1,405 | 2,357 | 1,561 | |
| 12 | 804 | 440 | 1,005 | 550 | 1,206 | 660 | 1,447 | 792 | 1,608 | 880 | 1,004 | 693 | 1,255 | 866 | 1,506 | 1,039 | 1,807 | 1,247 | 2,008 | 1,385 | |
| 14 | 735 | 416 | 919 | 520 | 1,103 | 624 | 1,323 | 749 | 1,470 | 832 | 919 | 634 | 1,148 | 793 | 1,378 | 951 | 1,654 | 1,141 | 1,838 | 1,268 | |
| 16 | 647 | 382 | 808 | 477 | 970 | 572 | 1,164 | 687 | 1,293 | 763 | 809 | 558 | 1,011 | 698 | 1,214 | 837 | 1,456 | 1,005 | 1,618 | 1,117 | |
| 18 | 577 | 351 | 722 | 439 | 866 | 527 | 1,039 | 633 | 1,155 | 703 | 723 | 499 | 903 | 623 | 1,084 | 748 | 1,301 | 898 | 1,446 | 998 | |
| 20 | 521 | 318 | 652 | 397 | 782 | 477 | 938 | 572 | 1,043 | 635 | 653 | 451 | 816 | 563 | 980 | 676 | 1,176 | 811 | 1,306 | 901 | **Sleeve MAOP** |
| 22 | 475 | 290 | 594 | 362 | 713 | 434 | 855 | 521 | 950 | 579 | 596 | 411 | 745 | 514 | 894 | 617 | 1,072 | 740 | 1,191 | 822 | |
| 24 | 437 | 266 | 546 | 333 | 655 | 399 | 786 | 479 | 873 | 532 | 548 | 378 | 684 | 472 | 821 | 567 | 986 | 680 | 1,095 | 756 | |
| 26 | 404 | 246 | 505 | 308 | 606 | 369 | 727 | 443 | 808 | 492 | 507 | 350 | 633 | 437 | 760 | 524 | 912 | 629 | 1,013 | 699 | |
| 28 | 376 | 229 | 470 | 286 | 563 | 343 | 676 | 412 | 751 | 458 | 471 | 325 | 589 | 407 | 707 | 488 | 848 | 586 | 943 | 651 | |
| 30 | 351 | 214 | 439 | 267 | 527 | 321 | 632 | 385 | 702 | 428 | 441 | 304 | 551 | 380 | 661 | 456 | 793 | 547 | 881 | 608 | |
| 32 | 330 | 201 | 412 | 251 | 494 | 301 | 593 | 361 | 659 | 402 | 414 | 286 | 517 | 357 | 621 | 428 | 745 | 514 | 828 | 571 | |
| 34 | 311 | 189 | 388 | 237 | 466 | 284 | 559 | 341 | 621 | 378 | 390 | 269 | 487 | 336 | 585 | 404 | 702 | 484 | 780 | 538 | |
| 36 | 294 | 179 | 367 | 224 | 440 | 268 | 528 | 322 | 587 | 358 | 369 | 254 | 461 | 318 | 553 | 382 | 664 | 458 | 738 | 509 | |

| Pipe NPS | 3/8 | | | | | | | | | | 1/2 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 6 | 2,180 | 1,452 | 2,725 | 1,815 | 3,270 | 2,178 | 3,924 | 2,613 | 4,361 | 2,904 | | | | | | | | | | | |
| 8 | 1,721 | 1,246 | 2,152 | 1,557 | 2,582 | 1,869 | 3,098 | 2,243 | 3,443 | 2,492 | | | | | | | | | | | |
| 10 | 1,407 | 1,045 | 1,758 | 1,307 | 2,110 | 1,568 | 2,532 | 1,882 | 2,813 | 2,091 | | | | | | | | | | | |
| 12 | 1,200 | 892 | 1,500 | 1,115 | 1,800 | 1,338 | 2,160 | 1,605 | 2,400 | 1,784 | 1,582 | 1,279 | 1,978 | 1,599 | 2,373 | 1,919 | 2,848 | 2,303 | 3,164 | 2,559 | |
| 14 | 1,099 | 817 | 1,374 | 1,021 | 1,649 | 1,225 | 1,979 | 1,470 | 2,199 | 1,634 | 1,451 | 1,174 | 1,814 | 1,467 | 2,177 | 1,761 | 2,612 | 2,113 | 2,903 | 2,347 | |
| 16 | 969 | 720 | 1,211 | 900 | 1,454 | 1,080 | 1,744 | 1,296 | 1,938 | 1,440 | 1,282 | 1,037 | 1,602 | 1,296 | 1,923 | 1,555 | 2,307 | 1,866 | 2,564 | 2,073 | |
| 18 | 866 | 644 | 1,083 | 805 | 1,299 | 966 | 1,559 | 1,159 | 1,733 | 1,288 | 1,148 | 928 | 1,435 | 1,160 | 1,722 | 1,392 | 2,066 | 1,671 | 2,296 | 1,856 | |
| 20 | 783 | 582 | 979 | 728 | 1,175 | 873 | 1,410 | 1,048 | 1,567 | 1,164 | 1,039 | 840 | 1,299 | 1,050 | 1,559 | 1,260 | 1,870 | 1,513 | 2,078 | 1,681 | |
| 22 | 715 | 531 | 894 | 664 | 1,072 | 797 | 1,287 | 956 | 1,430 | 1,062 | 949 | 768 | 1,187 | 960 | 1,424 | 1,151 | 1,709 | 1,382 | 1,899 | 1,535 | **Sleeve MAOP** |
| 24 | 657 | 489 | 822 | 611 | 986 | 733 | 1,183 | 879 | 1,315 | 977 | 874 | 707 | 1,092 | 883 | 1,311 | 1,060 | 1,573 | 1,272 | 1,747 | 1,413 | |
| 26 | 608 | 452 | 761 | 565 | 913 | 678 | 1,095 | 814 | 1,217 | 904 | 809 | 654 | 1,012 | 818 | 1,214 | 982 | 1,457 | 1,178 | 1,619 | 1,309 | |
| 28 | 566 | 421 | 708 | 526 | 849 | 631 | 1,019 | 758 | 1,133 | 842 | 754 | 610 | 942 | 762 | 1,131 | 914 | 1,357 | 1,097 | 1,507 | 1,219 | |
| 30 | 530 | 394 | 662 | 492 | 794 | 590 | 953 | 708 | 1,059 | 787 | 705 | 570 | 882 | 713 | 1,058 | 856 | 1,270 | 1,027 | 1,411 | 1,141 | |
| 32 | 497 | 370 | 622 | 462 | 746 | 554 | 895 | 665 | 995 | 739 | 663 | 536 | 828 | 670 | 994 | 804 | 1,193 | 965 | 1,325 | 1,072 | |
| 34 | 469 | 348 | 586 | 436 | 703 | 523 | 844 | 627 | 938 | 697 | 625 | 505 | 781 | 632 | 937 | 758 | 1,125 | 910 | 1,250 | 1,011 | |
| 36 | 443 | 330 | 554 | 412 | 665 | 494 | 798 | 593 | 887 | 659 | 591 | 478 | 739 | 598 | 887 | 717 | 1,064 | 861 | 1,183 | 956 | |

| Pipe NPS | 5/8 | | | | | | | | | | 3/4 | | | | | | | | | | Sleeve Thickness (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .04 | | .05 | | .06 | | .072 | | .08 | | .04 | | .05 | | .06 | | .072 | | .08 | | Design Factor |
| | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | NG | G | Backing Strip Groove |
| 16 | 1,586 | 1,344 | 1,982 | 1,680 | 2,379 | 2,016 | 2,854 | 2,419 | 3,171 | 2,688 | | | | | | | | | | | |
| 18 | 1,422 | 1,205 | 1,778 | 1,507 | 2,133 | 1,808 | 2,560 | 2,169 | 2,844 | 2,411 | | | | | | | | | | | |
| 20 | 1,289 | 1,092 | 1,611 | 1,366 | 1,933 | 1,639 | 2,320 | 1,966 | 2,578 | 2,185 | | | | | | | | | | | |
| 22 | 1,179 | 999 | 1,473 | 1,249 | 1,768 | 1,499 | 2,122 | 1,798 | 2,357 | 1,998 | | | | | | | | | | | |
| 24 | 1,086 | 920 | 1,357 | 1,150 | 1,629 | 1,380 | 1,954 | 1,656 | 2,172 | 1,841 | 1,294 | 1,130 | 1,617 | 1,412 | 1,941 | 1,695 | 2,329 | 2,034 | 2,587 | 2,260 | |
| 26 | 1,006 | 853 | 1,258 | 1,066 | 1,510 | 1,280 | 1,812 | 1,535 | 2,013 | 1,706 | 1,200 | 1,048 | 1,500 | 1,310 | 1,800 | 1,572 | 2,160 | 1,886 | 2,400 | 2,096 | |
| 28 | 938 | 795 | 1,172 | 994 | 1,407 | 1,192 | 1,688 | 1,431 | 1,876 | 1,590 | 1,119 | 977 | 1,399 | 1,222 | 1,679 | 1,466 | 2,014 | 1,759 | 2,238 | 1,955 | |
| 30 | 878 | 744 | 1,098 | 930 | 1,317 | 1,116 | 1,581 | 1,340 | 1,756 | 1,489 | 1,048 | 915 | 1,310 | 1,144 | 1,572 | 1,373 | 1,887 | 1,648 | 2,097 | 1,831 | |
| 32 | 826 | 700 | 1,032 | 875 | 1,238 | 1,050 | 1,486 | 1,259 | 1,651 | 1,399 | 986 | 861 | 1,232 | 1,076 | 1,479 | 1,292 | 1,775 | 1,550 | 1,972 | 1,722 | |
| 34 | 779 | 660 | 974 | 825 | 1,168 | 990 | 1,402 | 1,188 | 1,558 | 1,320 | 931 | 813 | 1,163 | 1,016 | 1,396 | 1,219 | 1,675 | 1,463 | 1,861 | 1,625 | |
| 36 | 737 | 625 | 921 | 781 | 1,106 | 937 | 1,327 | 1,125 | 1,474 | 1,250 | 881 | 769 | 1,101 | 962 | 1,322 | 1,154 | 1,586 | 1,385 | 1,762 | 1,539 | **Sleeve MAOP** |

For over five decades, TEAM Inc. has provided asset integrity to diverse industries, including oil and gas, aerospace, petrochemicals, pipeline, and power generation. Our integrated service approach covers everything from inspection to repair, ensuring our communities operate safely and efficiently.

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# Engineered Composite Repairs

## Standard Solutions

# Standard Engineered Composite Repairs

## ASME PCC-2 Compliant

### Overview

Cost-effective maintenance of the integrity of pressurized equipment is a basic requirement for operators and a growing challenge as our infrastructure ages. Engineered composite repairs have proven a key tool in achieving this objective and TEAM remains at the heart of the development and standardization of this technology. We lead the industry in bringing reliability and traceability to repairs, controlling each step of the delivery process to give full confidence in the solutions supplied and to clearly support this with verifiable documentation.

The standards ASME PCC-2 and ISO 24817 set out the requirements for engineered composite repairs. Providing repairs that comply with these requirements enables the operator, supplier and regulator to have confidence in the solution provided. However, the detailed requirements need expert assessment and understanding to be implemented as intended. Playing an integral role in writing and developing both ISO and ASME standards since their inception, we have built our process to do just this. Our in-house controls provide an auditable approach allowing us to demonstrate compliance of repairs installed with the governing standards while allowing you to continue to operate safely. We manage the entire process of supplying the repair so that you only have one point of contact. Our expertise means you get the repair you need.

### Our experience includes:

+ Pressures up to 345bar (5000psi)
+ Temperatures from -180°C to 260°C (-292°F to 500°F)
+ Diameters up to 18m (59') and continuous lengths of over 150m (500')

### Repairs are used commonly on:

+ Water lines
+ Oil lines
+ Flare lines
+ Gas lines
+ Chemical systems
+ Tanks and vessels
+ Gas and liquid pipelines
+ Structural repairs
+ Offshore and onshore
+ Deck Repairs

### Why TEAM?

+ **Single supplier, single point of contact worldwide**
+ **Company-wide commitment to safety**
+ **Trained and certified technicians**
+ **Complete range of maintenance and repair services**
+ **Engineering, manufacturing and technical support**
+ **World class quality processes and systems**

TEAM has unmatched global resources when it comes to engineered composite repairs. We have developed standardized technician competence programs so that we can demonstrate that the teams sent to site have the skills required for the job. We have the resources to handle jobs of all sizes whilst remaining local so that we can deal with your day to day emergencies.

Our Engineering teams can assess composite repair requirements but can also guide on their suitability; we will guide you towards the best solution to your problem – which has led to composites being used in combination with leak sealing services previously. Where detailed assessment is required we have the expertise to provide Fitness for Service (FFS) assessments and develop unique solutions and we can help you with through-life inspection of composite repairs once they are in service. With strength in depth as well as in breadth, we believe you will appreciate the benefit that comes with TEAM work.

## FCR Engineered Composite Repair Systems

TEAM's Standard Composite Repair systems have been verified by ABS and Lloyds Register as compliant with ASME PCC-2. With 20 years' service experience, the systems have an enviable track record and are further supported by independent testing in industry programs. The systems are based on a range of high performance, toughened epoxy resins, that cover a wide temperature range of service temperatures, reinforced with either carbon or glass fibre fabrics. Common surface preparation methods have been validated to simplify installation.

## Designed for Immediate Use

ASME PCC-2 requires repair thickness to be determined by calculation. TEAM has completed the design calculations required for the specified performance envelope; if the pipe and defect fall within the quoted range then repairs can be applied immediately. These assessments are available for review and approval.

The standard kits can be used for a wider range of conditions if these are first reviewed by Team's Engineering group. Calculations will be provided to you for approval before the repair is installed. However, there is no need to wait for material to be shipped – standard kits can be kept onsite, ready for immediate use.

These two options ensure there is no loss of control. The only reduction is the delay between a defect being discovered and the repair installed, increasing the integrity of your pressurised systems.

## Design Envelope

### Pressure Ratings:

+ Class 150 (20bar (285psi)
+ Class 300 (52bar (750psi)

### Temperature Ratings:

+ 68°C (154°F) or
+ 119°C (246F)

### Defects sizes:

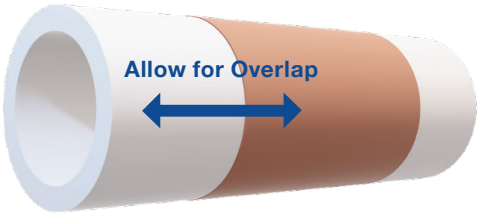
+ Class 150 – Holes up to 12.5mm (½")
+ Class 150 and Class 300 – wall thinning to 1mm (0.04") remaining no size limit

### Chemical Compatibility

In general, suitable for use in contact with fluids which have a pH of between 3.5 and 11 and do NOT contain strong solvents, such as methanol, glycol, benzene or toluene, in concentration greater than 25%.

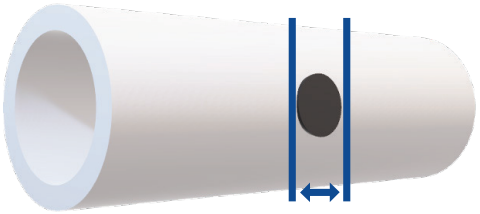
## External Corrosion and Wall Thinning

+ Repair must overlap onto a section prepared thoroughly by bristle blasting by specified length.
+ No limit to extent of defect but the repair is not intended to provide pressure containment if corrosion breaks through-wall. Suitable for 52bar (750psi) service.

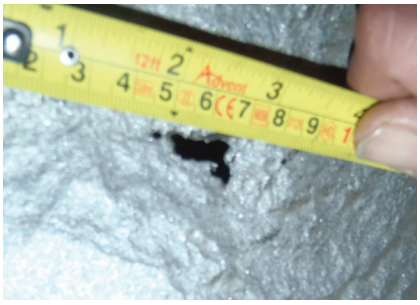



## Through-Wall Defects

+ Standard design for 20bar (285psi) only applies to holes ≤12.5mm (½") diameter where the pipe can be bristle blasted around the full extent of the defect.
+ Contact Team for instructions on repairing larger defects or those where full cleaning is not possible.




**Defect ≤12.5mm (½") diameter, covered by standard design**



**Defect >12.5mm (½"), not covered by standard design**

## Flexibility Comes as Standard

The contents of the kits are designed to be interchangeable to reduce inventory requirements (and therefore cost) and ensure the materials can be used across a range of common applications. Two basic kit types are available delineated by temperature capability and are based either on our standard temperature repair system or our high temperature repair system. There are three equivalent sizes of each kit – small, medium and large.

Each kit size is available with fabric in widths of either 60mm (2.25”) or 635mm (25”). The narrow tapes are ideal for smaller diameter lines and elbows. The wider sheets are more suitable for repair of tees and larger diameter lines. The most suitable options for each case are clearly recommended in the tables that follow.

The standard repair system will cure at ambient conditions and is suitable for service at up to 78°C (172°F). It is resistant to a wide range of common chemicals. The high temperature repair system is suitable for service at up to 119°C (246°F). It hardens at ambient temperature but needs heating to at least 40°C (104°F) to develop strength and is generally post-cured using our heat treatment equipment. It has excellent chemical resistance.

Installation tools and PPE are also available in standard pack sizes, each suitable for day’s work on site. The PPE comes in a range of sizes (L to XXXL).

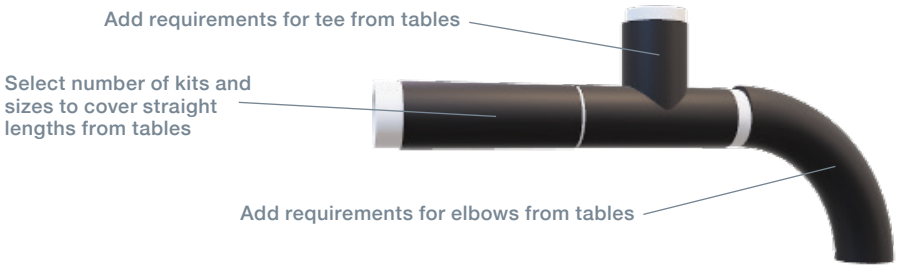

**Installation tool kit**


**Small standard temperature kit with 635mm (25”) fabric**


**Small high temperature kit with 60mm (2.5”) fabric**


**XL PPE kit**

## Calculating Kit Requirements




Where the pipe and defect fit within the standard envelope then the number of kits required is calculated using the process shown here.

Measure defect size and confirm within design envelope → Add overlap requirement → Calculate how many kits are required → Add elbow and tee kits → Add PPE and Tool kits (per day) → Add coating kits

## Overlap Requirements for Schedule 40 Pipe

Repairs must extend onto undamaged pipe either side of defect by a minimum of the overlap lengths given here. Contact TEAM Engineering for advice if this length is not available. The overlap lengths must be cleaned by bristle blasting. Surface preparation should extend 25mm (1") further each side to accommodate the E-glass base-layer.

| Standard Overlaps for Schedule 40 Material | | | | |
|---|---|---|---|---|
| Required repair length = defect + 2x overlap + 2x taper | | | | |
| **Diameter, in** | **OD, mm** | **Wall, mm** | **Overlap, mm** | **Overlap, in** |
| **≤2** | 60.3 | 3.9 | 50 | 2.000 |
| **3** | 88.9 | 5.5 | 50 | 2.000 |
| **4** | 114.3 | 6.0 | 50 | 2.000 |
| **6** | 168.3 | 7.1 | 61 | 2.500 |
| **8** | 219.1 | 8.25 | 75 | 3.000 |
| **10** | 273 | 9.3 | 89 | 3.625 |
| **12** | 323.9 | 10.3 | 102 | 4.125 |
| **14** | 355.6 | 11.1 | 111 | 4.375 |
| **16** | 406.4 | 12.7 | 127 | 5.000 |
| **18** | 457.2 | 14.27 | 143 | 5.625 |


## Installation Planning

An estimate of the total installation time should include an allowance for the team size, setting up, surface preparation, repair installation, cure, post-cure, inspection and coating. The time taken to install the repair will be extended if access to the area of concern is restricted. In general, it is expected that the kits can be installed within half a shift. A second visit after they have cured will be required to complete inspection and coating tasks.

## Standard Kits

For repairs that fall within the standard design envelope, the charts show the lengths (in metres) that can be repaired on a straight line using each kit size. Select the sizes and number of kits you need to cover the full extent of the defect after adding on the overlap requirement each end.

The requirements for elbows and tees are based on the standard components. If the repair is to cover straights, elbows and tees then simply total the number and sizes of kits required for each component.

Contact your local TEAM office for calculations and number of kits required for defects that fall outside the standard envelope.

| Standard Kits, 20bar 68°C | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Max repair length per kit, m | | | | 1.5D 90° Elbow | | Equal Tee | |
| diameter | #layers | S | M | L | #layers | Kits | #layers | Kits |
| ≤2 | 4 | 0.86 | 1.71 | 4.19 | 4 | S | 4 | S |
| 3 | 4 | 0.58 | 1.16 | 2.84 | 4 | S | 4 | S |
| 4 | 4 | 0.45 | 0.91 | 2.21 | 4 | S | 4 | S |
| 6 | 4 | 0.31 | 0.61 | 1.50 | 4 | L | 4 | M |
| 8 | 4 | | 0.47 | 1.15 | 4 | L | 4 | L |
| 10 | 4 | | 0.38 | 0.93 | 4 | L + S | 5 | L |
| 12 | 4 | | 0.32 | 0.78 | 4 | 2 x L | 6 | L + M |
| 14 | 4 | | 0.29 | 0.71 | 4 | 2 x L | 6 | 2 x L |
| 16 | 4 | | | 0.62 | 5 | 3 x L + S | 7 | 2 x L + S |
| 18 | 4 | | | 0.55 | 5 | 4 x L | 8 | 3 x L + S |
| 60mm tape recommended for 8”NB and below | | | | | | | Use 635mm Fabric for all diameters | |
| 635mm fabric recommended for larger diameters | | | | | | | | |

| Standard Kits, 52bar 68°C | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Max repair length per kit, m | | | | 1.5D 90° Elbow | | Equal Tee | |
| diameter | #layers | S | M | L | #layers | Kits | #layers | Kits |
| ≤2 | 4 | 0.86 | 1.71 | 4.19 | 4 | S | 4 | S |
| 3 | 4 | 0.58 | 1.16 | 2.84 | 4 | S | 4 | S |
| 4 | 4 | 0.45 | 0.91 | 2.21 | 4 | S | 5 | M |
| 6 | 4 | 0.31 | 0.61 | 1.50 | 5 | L | 8 | L |
| 8 | 5 | | 0.38 | 0.92 | 6 | L + M | 10 | L + S |
| 10 | 6 | | | 0.62 | 8 | 2 x L + S | 12 | 2 x L |
| 12 | 8 | | | 0.39 | 9 | 4 x L | | 4 x L |
| 60mm tape recommended for 8”NB and below | | | | | | | Use 635mm Fabric for all diameters | |
| 635mm fabric recommended for larger diameters | | | | | | | | |

## High Temperature Kits

For repairs that fall within the standard design envelope, the charts show the lengths (in metres) that can be repaired on a straight line using each kit size. Select the sizes and number of kits you need to cover the full extent of the defect after adding on the overlap requirement each end.

The requirements for elbows and tees are based on the standard components. If the repair is to cover straights, elbows and tees then simply total the number and sizes of kits required for each component.

Contact your local TEAM office for calculations and number of kits required for defects that fall outside the standard envelope.

| High Temperature Kits, 20bar, 119°C | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Max repair length per kit, m | | | | 1.5D 90° Elbow | | Equal Tee | |
| diameter | #layers | S | M | L | #layers | Kits | #layers | Kits |
| ≤2 | 4 | 0.86 | 1.71 | 4.19 | 4 | S | 4 | S |
| 3 | 4 | 0.58 | 1.16 | 2.84 | 4 | S | 4 | S |
| 4 | 4 | 0.45 | 0.91 | 2.21 | 4 | S | 4 | S |
| 6 | 4 | 0.31 | 0.61 | 1.50 | 4 | L | 6 | L |
| 8 | 4 | | 0.47 | 1.15 | 5 | L | 8 | L |
| 10 | 5 | | 0.30 | 0.74 | 6 | 2 x L | 10 | 2 x L |
| 12 | 6 | | 0.21 | 0.52 | 7 | 3 x L | 12 | 3 x L |
| 14 | 7 | | 0.17 | 0.41 | 8 | 4 x L | | |
| 16 | 8 | | | 0.31 | 9 | 6 x L | | |
| 18 | 8 | | | 0.28 | 10 | 8 x L | | |
| 60mm tape recommended for 8”NB and below | | | | | | | Use 635mm Fabric for all diameters | |
| 635mm fabric recommended for larger diameters | | | | | | | | |

| High Temperature Kits, 52bar, 119°C | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Max repair length per kit, m | | | | 1.5D 90° Elbow | | Equal Tee | |
| diameter | #layers | S | M | L | #layers | Kits | #layers | Kits |
| ≤2 | 4 | 0.86 | 1.71 | 4.19 | 4 | S | 6 | S |
| 3 | 4 | 0.58 | 1.16 | 2.84 | 5 | S | 8 | M |
| 4 | 6 | 0.30 | 0.60 | 1.47 | 7 | M | 11 | L |
| 6 | 8 | 0.15 | 0.31 | 0.75 | 9 | L | | |
| 8 | 10 | | 0.19 | 0.46 | 12 | 2 x L + S | | |
| 10 | 13 | | | 0.28 | | | | |
| 12 | 15 | | | 0.21 | | | 29 | 6 x L + M |
| 60mm tape recommended for 8”NB and below | | | | | | | Use 635mm Fabric for all diameters | |
| 635mm fabric recommended for larger diameters | | | | | | | | |

## Additional Requirements

### TEAM FCR Coating

+ Select number of kits from the table.

### Installation Kits

+ One kit contains the tools for one a typical repair.
+ Base requirement on one kit per repair or two kits per day.
+ Larger repairs should allow for using two kits per day

### PPE Kits

+ One kit contains required protection for two technicians for one day on site.
+ Multiply up as required.
+ Available in L, XL, XXL and XXXL sizes

### Additional Protection

+ Includes two pairs of eye goggles, vapour masks and dust masks.
+ Required when determined by risk assessment.
+ All equipment can be re-used in line with manufacturer's guidance

| TEAM FCR Coating | |
|---|---|
| Length Covered, 1kg per kit | |
| Diameter, in | Coverage, m |
| ≤2 | 9.06 |
| 3 | 6.44 |
| 4 | 5.12 |
| 6 | 3.57 |
| 8 | 2.78 |
| 10 | 2.25 |
| 12 | 1.91 |
| 14 | 1.74 |
| 16 | 1.53 |
| 18 | 1.36 |

## Installation and Controls

TEAM's technicians are trained in line with requirements of industry standards. Installation includes completion of QA records which are retained by TEAM Engineering for future reference. This enables us to provide support for on-going fitness for service of repairs.

TEAM's inspection group can support with more detailed assessment and verification of repairs. Choosing our standard repair systems improves your management of integrity without compromise, making the task simpler, faster and more predictable.


## TEAM's Standard Repairs Process

Check if requirement is within pre-engineered limits. If so, continue, if not then collate information and contact TEAM Engineering for guidance and kit requirements.

Calculate number of kits of each size required. Include an allowance for overlap for all ends of the repair.

Install in line with standard procedures, completing installation record sheets. Live leaks must be patched (within defect size limits) before repairs are applied.

Return installation records to Engineering for retention along with QA photographs.

## Recommended Cure Times for Standard Temperature Kits

| Standard Temperature Resin, ST(b) | | |
|---|---|---|
| **Temperature** | **Defect Type A** | **Defect Type B** |
| **5°C (41°F)** | 36 hours | 7 days |
| **10°C (50°F)** | 28 hours | 5 days |
| **15°C (59°F)** | 24 hours | 4 days |
| **20°C (68°F)** | 14 hours | 3 days |
| **25°C (77°F)** | 12 hours | 2 days |
| **30°C (86°F)** | 12 hours | 36 hours |
| **40°C (104°F)** | 6 hours | 12 hours |

## Recommended Cure Times for Standard Temperature Kits

| High Temperature Resin, HT | | | |
|---|---|---|---|
| **Temperature** | **Hardening** | **Defect Type A** | **Defect Type B** |
| **5°C (41°F)** | 3 days | Post-cure for 8 hours at 40°C (104°F) or 4 hours at 80°C (176°F) | Post-cure for 24 hours at 40°C (104°F) or 4 hours at design temperature where design temperature is ≥80°C (176°F) |
| **10°C (50°F)** | 36 hours | | |
| **15°C (59°F)** | 30 hours | | |
| **20°C (68°F)** | 20 hours | | |
| **30°C (86°F)** | 12 hours | | |
| **40°C (104°F)** | 8 hours | 24 hours | 24 hours |

*Elevated temperature post-cure should only commence after the repair has hardened. Heating rates should not exceed 80°C per hour.*

**TEAM's IHT service can provide post-cure heating using a tested and proven method.**

## Ordering Information

| Kit Size | Tape - 65mm (2.5”) | Fabric - 635mm (25”) |
|---|---|---|
| Small ST(b) repair kit | KIT01-901-000028 | KIT01-901-000029 |
| Medium ST(b) repair kit | KIT01-901-000030 | KIT01-901-000031 |
| Large ST(b) repair kit | KIT01-901-000032 | KIT01-901-000033 |
| Small HT repair kit | KIT01-901-000034 | KIT01-901-000035 |
| Medium HT repair kit | KIT01-901-000036 | KIT01-901-000037 |
| Large HT repair kit | KIT01-901-000038 | KIT01-901-000039 |

*Select 65mm (2.5”) tape for pipes ≤8” diameters*

*Select 635mm (25”) fabric for larger diameters*

*Select 635mm (25”) fabric for ALL tees*

| Additional Kits | Part Number |
|---|---|
| Installation kit | KIT01-901-000040 |
| L PPE Kit | KIT01-901-000022 |
| XL PPE Kit | KIT01-901-000023 |
| XXL PPE Kit | KIT01-901-000024 |
| XXXL PPE Kit | KIT01-901-000025 |
| ST Additional Protection | KIT01-901-000026 |
| HT Additional Protection | KIT01-901-000027 |
| Coating kit (Two-part epoxy) | KIT01-901-000021 |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