



Expandable Steel Patches

Datasheets

Standard and High-Temperature Expandable Steel Patches

Saltelex expandable steel patches provide a permanent solution for repairing a zone of damaged tubing or casing, shutting off unwanted perforations, or performing other remedial operations. Standard and HT models and typical casing weights are shown below, but a given expandable steel patch can also be used in other intermediate weights of tubing or casing. Standard patches can be used up to 302 degF

[150 degC]. HT patches are suitable up to 446 degF [230 degC]. They have short-term resistance to 482 degF [250 degC] and are ISO 14310-qualified up to that temperature. Nominal length is 12–40 ft [4–12 m]; it is limited to the maximum that can be picked up in one piece. Longer zones can usually be treated by overlapping patches. Other sizes and ratings are available on request.

Patch Model	Casing size, in [mm]	4½ [114.3]					5 [127]					5½ [139.7]								
	Casing weight, lbm/ft [kg/m]	15.10 [22.47]	13.50 [20.09]	12.60 [18.75]	11.60 [17.26]	10.50 [15.63]	9.50 [14.14]	24.10 [35.86]	23.20 [34.53]	21.40 [31.85]	18.00 [26.79]	13.00 [19.35]	11.50 [17.11]	26.80 [39.88]	26.00 [38.69]	23.00 [34.23]	20.00 [29.76]	17.00 [25.30]	15.50 [23.07]	14.00 [20.83]
	Nominal casing ID, in [mm]	3.826 [97.2]	3.920 [99.6]	3.958 [100.5]	4.000 [101.6]	4.052 [102.9]	4.090 [103.9]	4.000 [101.6]	4.044 [102.7]	4.126 [104.8]	4.276 [108.6]	4.492 [114.1]	4.559 [115.8]	4.500 [114.3]	4.548 [115.5]	4.670 [118.6]	4.778 [121.4]	4.892 [124.3]	4.950 [125.7]	5.012 [127.3]
Patch Model	4½-in, R†																			
	4½-in, ER†																			
	5½-in, SL†																			
	5½-in, R																			
	5½-in, ER																			

†R: Reinforced ER: Extra-reinforced SL: Slimline Limited use

Patch Model	Casing size, in [mm]	6% [168.3]			7 [177.8]						7½ [193.7]				8% [219.1]								
	Casing weight, lbm/ft [kg/m]	24.00 [35.72]	20.00 [29.76]	41.00 [61.01]	38.00 [56.55]	35.00 [52.09]	32.00 [47.62]	29.00 [43.16]	26.00 [38.69]	23.00 [34.23]	20.00 [29.76]	17.00 [25.30]	39.00 [58.04]	33.70 [50.15]	29.70 [44.20]	26.40 [39.29]	24.00 [35.72]	44.00 [65.48]	40.00 [59.53]	36.00 [53.57]	32.00 [47.62]	28.00 [41.67]	24.00 [35.72]
	Nominal casing ID, in [mm]	5.921 [150.4]	6.049 [153.6]	5.820 [147.8]	5.920 [150.4]	6.004 [152.5]	6.094 [154.8]	6.184 [157.1]	6.276 [159.4]	6.366 [161.7]	6.456 [164.0]	6.538 [166.1]	6.625 [168.3]	6.765 [171.8]	6.875 [174.6]	6.969 [177.0]	7.025 [178.4]	7.625 [193.7]	7.725 [196.2]	7.825 [198.8]	7.921 [201.2]	8.017 [203.6]	8.097 [205.7]
Patch Model	7-in, US†																						
	7-in, SL†																						
	7-in, R†																						
	7-in, ER†																						
	8%-in, US																						

†US: Ultraslim SL: Slimline R: Reinforced ER: Extra-reinforced Limited use

Patch Model	Casing size, in [mm]	9% [244.47]										10% [273.05]						11% [298.45]					13% [339.72]								
	Casing weight, lbm/ft [kg/m]	71.80 [106.9]	61.10 [90.93]	59.40 [88.40]	58.40 [86.91]	53.50 [79.62]	47.00 [69.94]	43.50 [64.73]	40.00 [59.53]	36.00 [53.57]	32.30 [48.07]	29.30 [43.60]	71.10 [105.8]	65.70 [97.77]	60.70 [90.33]	55.50 [82.59]	51.00 [75.90]	45.50 [67.71]	40.50 [60.27]	71.00 [105.7]	65.00 [96.73]	60.00 [89.29]	54.00 [80.36]	47.00 [69.94]	80.70 [120.1]	77.00 [114.6]	72.00 [107.2]	68.00 [101.2]	61.00 [90.78]	54.50 [81.10]	48.00 [71.43]
	Nominal casing ID, in [mm]	8.126 [206.4]	8.375 [212.7]	8.407 [213.5]	8.435 [214.2]	8.535 [216.8]	8.681 [220.5]	8.755 [222.4]	8.835 [224.4]	8.921 [226.6]	9.001 [228.6]	9.063 [230.2]	9.450 [240.0]	9.560 [242.8]	9.660 [245.4]	9.760 [247.9]	9.850 [250.2]	9.950 [252.7]	10.050 [255.3]	10.586 [268.9]	10.682 [271.3]	10.772 [273.6]	10.880 [276.4]	11.000 [279.4]	12.215 [310.3]	12.275 [311.8]	12.347 [313.6]	12.415 [315.3]	12.515 [317.9]	12.615 [320.4]	12.715 [323.0]
Patch Model	9%-in, US†																														
	9%-in, SL†																														
	10%-in, SL																														
	13%-in, IP†																														
	13%-in, SL																														

†US: Ultraslim SL: Slimline IP: Internal pressure Limited use

4½-in Patches (Standard and HT)



External DSPR up to
3,137 psi [216 bar]



Up to 482 degF
[250 degC]

Patch model	RIH OD, in [mm]	Steel grade	Elastomer type and thickness	Steel thickness, in [mm]	Casing size, in [mm]	4½ [114.3]						5 [127]			
						Casing weight, lbm/ft [kg/m]	Casing ID, in [mm]	Casing drift, in [mm]							
						15.10 [22.47]	13.50 [20.09]	12.60 [18.75]	11.60 [17.26]	10.50 [15.63]	9.50 [14.14]	24.10 [35.86]	23.20 [34.53]	21.40 [31.85]	18.00 [26.79]
						3.826 [97.18]	3.920 [99.57]	3.958 [100.53]	4.000 [101.60]	4.052 [102.92]	4.090 [103.89]	4.000 [101.60]	4.044 [102.72]	4.126 [104.80]	4.276 [108.61]
						3.701 [94.01]	3.795 [96.39]	3.833 [97.36]	3.875 [98.43]	3.927 [99.75]	3.965 [100.71]	3.875 [98.43]	3.919 [99.54]	4.001 [101.63]	4.151 [105.44]

4½-in, Reinforced	3,504 [89]	321 SS	HNBR, 0.059 in [1.5 mm]	0.118 [3]	Setting data	Expansion pressure, psi [bar]	4,867 [336]	5,290 [365]	5,464 [377]	5,670 [390]	5,950 [410]	6,140 [425]	5,660 [390]	5,860 [405]	6,200 [430]	6,819 [470]
						Geometry when set	Loss of diameter, in [mm]	0.362 [9.20]	0.357 [9.07]	0.355 [9.01]	0.353 [8.96]	0.350 [8.89]	0.348 [8.84]	0.353 [8.96]	0.350 [8.89]	0.348 [8.84]
Patch nominal ID, in [mm]	3.471 [88.16]	3.570 [90.67]	3.610 [91.68]	3.654 [92.80]	3.708 [94.19]		3.748 [95.20]	3.654 [92.80]	3.700 [93.97]	3.785 [96.15]	3.942 [100.12]					
Patch drift ID, in [mm]	3.339 [84.80]	3.438 [87.33]	3.478 [88.35]	3.522 [89.47]	3.577 [90.86]		3.617 [91.87]	3.522 [89.47]	3.569 [90.64]	3.655 [92.83]	3.812 [96.81]					
Differential service pressure rating (DSPR)	External DSPR, psi [bar]	1,960 [135]	1,826 [126]	1,775 [122]	1,722 [119]	1,659 [114]	1,615 [111]	1,722 [119]	1,668 [115]	1,575 [109]	1,424 [98]					

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 4,290 psi [295 bar] internally and approximately 600 psi [40 bar] externally.

4½-in, Extra-Reinforced	3,583 [91]	321 SS	HNBR, 0.059 in [1.5 mm]	0.157 [4]	Setting data	Expansion pressure, psi [bar]	6,360 [440]	6,480 [447]	6,620 [455]	6,790 [470]	6,920 [475]	6,620 [455]	6,760 [465]	7,040 [485]
						Geometry when set	Loss of diameter, in [mm]	0.437 [11.09]	0.434 [11.02]	0.431 [10.95]	0.428 [10.86]	0.425 [10.80]	0.431 [10.95]	0.428 [10.87]
Patch nominal ID, in [mm]	3.492 [88.70]	3.532 [89.72]	3.577 [90.86]	3.632 [92.26]	3.673 [93.28]		3.577 [90.86]	3.624 [92.05]	3.711 [94.25]					
Patch drift ID, in [mm]	3.358 [85.30]	3.399 [86.33]	3.444 [87.48]	3.499 [88.89]	3.540 [89.91]		3.444 [87.48]	3.491 [88.67]	3.578 [90.89]					
DSPR	External DSPR, psi [bar]	3,137 [216]	3,048 [210]	2,954 [204]	2,844 [196]	2,768 [191]	2,954 [204]	2,861 [197]	2,698 [186]					

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 4,970 psi [340 bar] internally and approximately 1,300 psi [90 bar] externally.

Notes: **Expansion pressure:** Differential pressure applied to the inflatable packer to set and seal the patch. Values are calculated at 68 degF [20 degC] and are lower at higher temperatures. **Loss of diameter:** Loss of diameter between Patch drift ID and casing drift ID. **Patch nominal ID:** Patch ID when the patch is set in nominal ID tubular. **Patch drift ID:** Takes into consideration the casing drift ID and the manufacturing tolerances of the patch. **External DSPR:** External DSPR at 68 degF [20 degC] when the patch is set in a casing with cylindrical geometry.

■ Reduced safety margin for setting pressure and patch expansion ratio.

5½-in Patches (Standard and HT)



External DSPR up to
3,458 psi [238 bar]



Up to 482 degF
[250 degC]

Patch model	RIH OD, in [mm]	Steel grade	Elastomer type and thickness	Steel thickness, in [mm]	Casing size, in [mm]	5 [127]				5½ [139.7]				
						Casing weight, lbm/ft [kg/m]	Casing ID, in [mm]	Casing drift, in [mm]	13.00 [19.35]	11.50 [17.11]	26.80 [39.88]	26.00 [38.69]	23.00 [34.23]	20.00 [29.76]
						4.492 [114.10]	4.559 [115.80]	4.500 [114.30]	4.548 [115.52]	4.670 [118.62]	4.778 [121.36]	4.892 [124.26]	4.950 [125.73]	5.012 [127.30]
						4.369 [110.97]	4.435 [112.65]	4.375 [111.13]	4.423 [112.34]	4.545 [115.44]	4.653 [118.19]	4.767 [121.08]	4.825 [122.56]	4.887 [124.13]

5½-in, Slimline	4.33 [110.0]	321 SS	HNBR, 0.059 in [1.5 mm]	0.118 [3]	Setting data	Expansion pressure, psi [bar]	3,683 [254]	3,865 [267]	3,704 [255]	3,835 [264]	4,192 [289]	4,528 [312]	4,893 [337]	5,084 [351]	5,270 [363]
					Geometry when set	Loss of diameter, in [mm]	0.370 [9.40]	0.367 [9.32]	0.370 [9.39]	0.367 [9.33]	0.361 [9.18]	0.357 [9.06]	0.352 [8.94]	0.349 [8.88]	0.347 [8.82]
						Patch nominal ID, in [mm]	4.128 [104.86]	4.198 [106.63]	4.136 [105.06]	4.187 [106.34]	4.314 [109.58]	4.427 [112.44]	4.545 [115.45]	4.605 [116.97]	4.670 [118.61]
						Patch drift ID, in [mm]	3.999 [101.57]	4.068 [103.33]	4.005 [101.73]	4.056 [103.01]	4.184 [106.26]	4.296 [109.13]	4.415 [112.15]	4.476 [113.68]	4.540 [115.31]
					Differential service pressure rating (DSPR)	External DSPR, psi [bar]	1,538 [106]	1,472 [102]	1,530 [106]	1,483 [102]	1,372 [95]	1,283 [88]	1,198 [83]	1,159 [80]	1,118 [77]

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 3,470 psi [240 bar] internally and approximately 400 psi [27 bar] externally.

5½-in, Reinforced	4.33 [110.0]	321 SS	HNBR, 0.059 in [1.5 mm]	0.157 [4]	Setting data	Expansion pressure, psi [bar]	4,836 [334]	4,799 [331]	5,210 [359]	5,455 [376]	5,745 [396]	5,908 [407]	6,087 [420]
					Geometry when set	Loss of diameter, in [mm]	0.448 [11.38]	0.449 [11.40]	0.441 [11.20]	0.435 [11.05]	0.429 [10.89]	0.426 [10.81]	0.422 [10.73]
						Patch nominal ID, in [mm]	4.119 [104.62]	4.107 [104.32]	4.236 [107.60]	4.350 [110.49]	4.470 [113.53]	4.531 [115.08]	4.595 [116.72]
						Patch drift ID, in [mm]	3.987 [101.27]	3.974 [100.95]	4.104 [104.24]	4.218 [107.14]	4.338 [110.19]	4.399 [111.74]	4.465 [113.40]
					DSPR	External DSPR, psi [bar]	2,524 [174]	2,543 [175]	2,349 [162]	2,195 [151]	2,048 [141]	1,979 [136]	1,909 [132]

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 4,010 psi [275 bar] internally and approximately 900 psi [60 bar] externally.

5½-in, Extra-Reinforced	4.53 [115.0]	321 SS	HNBR, 0.059 in [1.5 mm]	0.197 [5]	Setting data	Expansion pressure, psi [bar]					5,776 [398]	6,343 [437]	6,650 [459]	6,982 [482]
					Geometry when set	Loss of diameter, in [mm]					0.524 [13.31]	0.516 [13.11]	0.512 [13.01]	0.508 [12.90]
						Patch nominal ID, in [mm]					4.263 [108.27]	4.384 [111.36]	4.446 [112.93]	4.512 [114.60]
						Patch drift ID, in [mm]					4.129 [104.87]	4.251 [107.98]	4.313 [109.55]	4.379 [111.23]
					DSPR	External DSPR, psi [bar]					3,458 [238]	3,221 [222]	3,109 [214]	2,996 [207]

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 5,500 psi [380 bar] internally and approximately 1,380 psi [95 bar] externally.

Notes: **Expansion pressure:** Differential pressure applied to the inflatable packer to set and seal the patch. Values are calculated at 68 degF [20 degC] and are lower at higher temperatures. **Loss of diameter:** Loss of diameter between Patch drift ID and casing drift ID. **Patch nominal ID:** Patch ID when the patch is set in nominal ID tubular. **Patch drift ID:** Takes into consideration the casing drift ID and the manufacturing tolerances of the patch. **External DSPR:** External DSPR at 68 degF [20 degC] when the patch is set in a casing with cylindrical geometry.

□ RIH clearance <0.125 in [3 mm] with casing drift ID.

7-in Patches (Standard and HT)



External DSPR up to
3,188 psi [220 bar]



Up to 482 degF
[250 degC]

Patch model	RIH OD, in [mm]	Steel grade	Elastomer type and thickness	Steel thickness, in [mm]	Casing size, in [mm]	6% [168.3]										7 [177.8]				7% [193.7]			
						Casing weight, lbm/ft [kg/m]														Casing ID, in [mm]			
						24.00 [35.72]	20.00 [29.76]	41.00 [61.01]	38.00 [56.55]	35.00 [52.09]	32.00 [47.62]	29.00 [43.16]	26.00 [38.69]	23.00 [34.23]	20.00 [29.76]	17.00 [25.30]	39.00 [58.04]	33.70 [50.15]	29.70 [44.20]	26.40 [39.29]	24.00 [35.72]		
						5.921 [150.39]	6.049 [153.64]	5.820 [147.83]	5.920 [150.37]	6.004 [152.50]	6.094 [154.79]	6.184 [157.07]	6.276 [159.41]	6.366 [161.70]	6.456 [163.98]	6.538 [166.07]	6.626 [168.30]	6.764 [171.80]	6.874 [174.60]	6.969 [177.00]	7.024 [178.40]		
						5.796 [147.22]	5.924 [150.47]	5.695 [144.65]	5.795 [147.19]	5.879 [149.33]	5.969 [151.61]	6.059 [153.90]	6.151 [156.24]	6.241 [158.52]	6.331 [160.81]	6.413 [162.89]	6.501 [165.13]	6.639 [168.63]	6.749 [171.43]	6.844 [173.83]	6.899 [175.23]		

7-in, Ultralight	5.590 [142]	321 SS	HNBR, 0.088 in [2.25 mm]	0.118 [3]	Setting data		Geometry when set																Differential service pressure rating (DSPR)								
					Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]										
					2,886 [199]	0.416 [10.58]	3,061 [211]	0.421 [10.689]	2,746 [189]	0.416 [10.58]	3,000 [207]	0.409 [10.39]	3,129 [216]	0.406 [10.30]	3,404 [235]	0.402 [10.21]	3,540 [244]	0.399 [10.13]	3,675 [263]	0.396 [10.05]	3,799 [262]	0.393 [9.98]	3,908 [270]	0.390 [9.90]	4,076 [281]	0.386 [9.79]	4,213 [291]	0.382 [9.71]			
					893 [62]	5.380 [136.64]	844 [58]	5.513 [140.03]	934 [64]	5.274 [133.96]	893 [62]	5.379 [136.62]	861 [59]	5.466 [138.84]	828 [57]	5.560 [141.22]	797 [53]	5.653 [143.60]	767 [53]	5.749 [146.02]	740 [51]	5.842 [148.39]	691 [48]	5.935 [150.76]	602 [46]	6.020 [152.91]	6.111 [155.22]	6.253 [158.83]	6.367 [161.71]		

For a hole or perforation ≤ 1 in [≤ 2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe > 12 in [> 30 cm] is 2,610 psi [180 bar] internally and approximately 170 psi [12 bar] externally.

7-in, Slimline	5.669 [144]	321 SS	HNBR, 0.088 in [2.25 mm]	0.157 [4]	Setting data		Geometry when set																DSPR									
					Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]											
					3,626 [250]	0.497 [12.63]	3,841 [265]	0.490 [12.46]	3,624 [250]	0.497 [12.63]	3,766 [260]	0.488 [12.40]	3,916 [270]	0.484 [12.29]	4,028 [278]	0.479 [12.17]	4,121 [284]	0.475 [12.07]	4,213 [291]	0.471 [11.97]	4,306 [297]	0.468 [11.88]	4,392 [303]	0.464 [11.79]	4,484 [309]	0.464 [11.65]	4,614 [318]	0.455 [11.55]	4,721 [326]	0.451 [11.47]		
					1,585 [109]	5.299 [134.59]	1,488 [103]	5.434 [138.01]	1,586 [109]	5.298 [134.56]	1,521 [105]	5.386 [136.81]	1,455 [100]	5.481 [139.21]	1,394 [96]	5.575 [141.61]	1,335 [92]	5.672 [144.06]	1,281 [88]	5.766 [146.45]	1,230 [85]	5.860 [148.84]	1,186 [82]	5.945 [151.01]	1,141 [79]	6.037 [153.33]	6.180 [156.97]	6.294 [159.87]	6.392 [162.36]			

For a hole or perforation ≤ 1 in [≤ 2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe > 12 in [> 30 cm] is 3,020 psi [208 bar] internally and approximately 400 psi [28 bar] externally.

7-in, Reinforced	5.748 [146]	321 SS	HNBR, 0.088 in [2.25 mm]	0.197 [5]	Setting data		Geometry when set																DSPR									
					Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]											
					4,360 [301]	0.571 [14.51]	4,360 [301]	0.571 [14.51]	4,262 [294]	0.574 [14.58]	4,457 [307]	0.569 [14.44]	4,650 [321]	0.563 [14.31]	4,854 [335]	0.558 [14.17]	5,055 [349]	0.553 [14.05]	5,255 [362]	0.548 [13.92]	5,438 [375]	0.544 [13.82]	5,645 [389]	0.540 [13.71]	5,972 [412]	6,216 [429]	6,466 [446]	6,757 [466]				
					2,259 [156]	5.353 [135.96]	2,259 [156]	5.353 [135.96]	2,310 [159]	5.305 [134.74]	2,209 [152]	5.400 [137.17]	2,115 [146]	5.496 [139.59]	2,024 [140]	5.593 [142.06]	1,941 [134]	5.688 [144.48]	1,863 [128]	5.783 [146.88]	1,796 [124]	5.869 [149.07]	1,728 [119]	5.961 [151.42]	6.106 [155.08]	6.221 [158.01]	6.351 [161.32]	6.521 [165.64]	6.757 [170.26]	7.024 [174.80]		

For a hole or perforation ≤ 1 in [≤ 2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe > 12 in [> 30 cm] is 4,270 psi [295 bar] internally and approximately 700 psi [48 bar] externally.

7-in, Extra-Reinforced	5.827 [148]	321 SS	HNBR, 0.088 in [2.25 mm]	0.236 [6]	Setting data		Geometry when set																DSPR								
					Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]	Expansion pressure, psi [bar]	Loss of diameter, in [mm]	Patch nominal ID, in [mm]	Patch drift ID, in [mm]	External DSPR, psi [bar]										
					4,858 [335]	0.654 [16.61]	4,858 [335]	0.654 [16.61]	4,974 [343]	0.651 [16.53]	5,206 [359]	0.644 [16.36]	5,452 [376]	0.638 [16.20]	5,684 [392]	0.632 [16.06]	5,931 [409]	0.626 [15.91]	6,148 [424]	0.621 [15.78]	6,380 [440]	0.616 [15.66]	6,630 [456]	0.611 [15.54]	6,884 [472]	7,152 [488]	7,432 [500]	7,724 [512]			
					3,188 [220]	5.404 [137.26]	3,188 [220]	5.404 [137.26]	3,117 [215]	5.318 [135.09]	2,982 [206]	5.415 [137.53]	2,853 [197]	5.513 [140.03]	2,735 [189]	5.609 [142.47]	2,623 [181]	5.705 [144.90]	2,527 [174]	5.792 [147.11]	2,433 [168]	5.883 [149.42]	2,343 [161]	6.015 [152.77]	6.163 [156.54]	6.331 [161.32]	6.521 [165.64]	6.757 [170.26]	7.024 [174.80]		

For a hole or perforation ≤ 1 in [≤ 2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe > 12 in [> 30 cm] is 5,100 psi [351 bar] internally and approximately 1,150 psi [80 bar] externally.

Notes: **Expansion pressure:** Differential pressure applied to the inflatable packer to set and seal the patch. Values are calculated at 68 degF [20 degC] and are lower at higher temperatures. **Loss of diameter:** Loss of diameter between Patch drift ID and casing drift ID. **Patch nominal ID:** Patch ID when the patch is set in nominal ID tubular. **Patch drift ID:** Takes into consideration the casing drift ID and the manufacturing tolerances of the patch. **External DSPR:** External DSPR at 68 degF [20 degC] when the patch is set in a casing with cylindrical geometry.

□ RIH clearance < 0.125 in [3 mm] with casing drift ID. ◻ Reduced safety margin for setting pressure and patch expansion ratio.

8⁵/₈-in Patches (Standard and HT)



External DSPR up to
605 psi [42 bar]



Up to 482 degF
[250 degC]

Patch model	RIH OD, in [mm]
	Steel grade
	Elastomer type and thickness
	Steel thickness, in [mm]

Casing size, in [mm]	8 ⁵ / ₈ [219.1]					
Casing weight, lbm/ft [kg/m]	44.00 [65.48]	40.00 [59.53]	36.00 [53.57]	32.00 [47.62]	28.00 [41.67]	24.00 [35.72]
Casing ID, in [mm]	7.625 [193.68]	7.725 [196.22]	7.825 [198.76]	7.921 [201.19]	8.017 [203.63]	8.097 [205.66]
Casing drift, in [mm]	7.500 [190.50]	7.600 [193.04]	7.700 [195.58]	7.796 [198.02]	7.892 [200.46]	7.972 [202.49]

8 ⁵ / ₈ -in, Ultrasim	7.264 [184.5]	321 SS	HNBR, 0.088 in [2.25 mm]	0.118 [3]	Setting data	Expansion pressure, psi [bar]	3,053 [211]	3,136 [216]	3,218 [222]	3,300 [228]	3,388 [234]	3,462 [239]
					Geometry when set	Loss of diameter, in [mm]	0.421 [10.68]	0.417 [10.60]	0.414 [10.52]	0.411 [10.45]	0.408 [10.38]	0.406 [10.32]
						Patch nominal ID, in [mm]	7.208 [183.09]	7.312 [185.71]	7.415 [188.33]	7.513 [190.84]	7.612 [193.35]	7.694 [195.43]
						Patch drift ID, in [mm]	7.079 [179.82]	7.183 [182.44]	7.286 [185.06]	7.385 [187.57]	7.484 [190.08]	7.566 [192.17]
					Differential service pressure rating (DSPR)	External DSPR, psi [bar]	605 [42]	585 [40]	566 [39]	548 [38]	389 [27]	378 [26]

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 1,970 psi [135 bar] internally and approximately 100 psi [7 bar] externally.

Notes: **Expansion pressure:** Differential pressure applied to the inflatable packer to set and seal the patch. Values are calculated at 68 degF [20 degC] and are lower at higher temperatures. **Loss of diameter:** Loss of diameter between Patch drift ID and casing drift ID. **Patch nominal ID:** Patch ID when the patch is set in nominal ID tubular. **Patch drift ID:** Takes into consideration the casing drift ID and the manufacturing tolerances of the patch. **External DSPR:** External DSPR at 68 degF [20 degC] when the patch is set in a casing with cylindrical geometry.

9⁵/₈-in Patches (Standard and HT)



External DSPR up to
1,362 psi [94 bar]



Up to 482 degF
[250 degC]

Patch model	RIH OD, in [mm]	Steel grade	Elastomer type and thickness	Steel thickness, in [mm]	9 ⁵ / ₈ [244.47]											
					Casing size, in [mm]	71.80 [106.85]	61.10 [90.93]	59.40 [88.40]	58.40 [86.91]	53.50 [79.62]	47.00 [69.94]	43.50 [64.73]	40.00 [59.53]	36.00 [53.57]	32.30 [48.07]	29.30 [43.60]
					Casing weight, lbm/ft [kg/m]	8.126 [206.40]	8.375 [212.73]	8.407 [213.54]	8.435 [214.25]	8.535 [216.79]	8.681 [220.50]	8.755 [222.38]	8.835 [224.41]	8.921 [226.59]	9.001 [228.63]	9.063 [230.20]
					Casing ID, in [mm]	7.969 [202.41]	8.218 [208.74]	8.250 [209.55]	8.278 [210.26]	8.378 [212.80]	8.524 [216.51]	8.598 [218.39]	8.678 [220.42]	8.764 [222.61]	8.845 [224.66]	8.907 [226.23]

9 ⁵ / ₈ -in, Ultralim	7.717 [196]	321 SS	HNBR, 0.118 in [3 mm]	0.118 [3]	9 ⁵ / ₈ [244.47]												
					Setting data	Expansion pressure, psi [bar]	3,045 [210]	3,248 [224]	3,277 [226]	3,306 [228]	3,393 [234]	3,524 [243]	3,596 [248]	3,669 [253]	3,741 [258]	3,828 [264]	3,886 [268]
					Geometry when set	Loss of diameter, in [mm]	0.467 [11.87]	0.459 [11.65]	0.458 [11.62]	0.457 [11.60]	0.454 [11.52]	0.449 [11.41]	0.447 [11.35]	0.445 [11.29]	0.442 [11.23]	0.440 [11.18]	0.438 [11.13]
						Patch nominal ID, in [mm]	7.663 [194.64]	7.921 [201.20]	7.954 [202.04]	7.983 [202.77]	8.086 [205.39]	8.236 [209.21]	8.313 [211.14]	8.395 [213.23]	8.483 [215.47]	8.565 [217.55]	8.629 [219.17]
Patch drift ID, in [mm]	7.502 [190.54]	7.760 [197.11]	7.793 [197.94]	7.822 [198.68]		7.925 [201.30]	8.076 [205.12]	8.152 [207.06]	8.234 [209.15]	8.323 [211.39]	8.405 [213.48]	8.468 [215.10]					
Differential service pressure rating (DSPR)	External DSPR, psi [bar]	397 [27]	364 [25]	360 [25]	356 [25]	344 [24]	328 [23]	320 [22]	312 [21]	303 [21]	296 [20]	290 [20]					

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 1,870 psi [128 bar] internally and approximately 60 psi [4 bar] externally.

9 ⁵ / ₈ -in, Slimline	7.874 [200]	321 SS	HNBR, 0.118 in [3 mm]	0.196 [5]	9 ⁵ / ₈ [244.47]											
					Setting data	Expansion pressure, psi [bar]	3,959 [273]	4,307 [297]	4,350 [300]	4,394 [303]	4,510 [311]	4,713 [325]	4,814 [332]	4,916 [339]	5,046 [348]	5,148 [355]
					Geometry when set	Loss of diameter, in [mm]	0.629 [15.97]	0.617 [15.66]	0.615 [15.62]	0.614 [15.59]	0.609 [15.47]	0.603 [15.31]	0.600 [15.23]	0.596 [15.15]	0.593 [15.06]	0.590 [14.98]
						Patch nominal ID, in [mm]	7.504 [190.60]	7.766 [197.25]	7.799 [198.10]	7.828 [198.84]	7.933 [201.49]	8.085 [205.35]	8.162 [207.31]	8.245 [209.42]	8.334 [211.68]	8.417 [213.79]
Patch drift ID, in [mm]	7.340 [186.44]	7.602 [193.10]	7.636 [193.95]	7.665 [194.69]		7.770 [197.35]	7.922 [201.22]	7.999 [203.17]	8.082 [205.29]	8.172 [207.56]	8.255 [209.67]					
DSPR	External DSPR, psi [bar]	1,362 [94]	1,244 [86]	1,230 [85]	1,218 [84]	1,177 [81]	1,120 [77]	1,092 [75]	1,007 [69]	982 [68]	960 [66]					

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 3,050 psi [210 bar] internally and approximately 310 psi [22 bar] externally.

Notes: **Expansion pressure:** Differential pressure applied to the inflatable packer to set and seal the patch. Values are calculated at 68 degF [20 degC] and are lower at higher temperatures. **Loss of diameter:** Loss of diameter between Patch drift ID and casing drift ID. **Patch nominal ID:** Patch ID when the patch is set in nominal ID tubular. **Patch drift ID:** Takes into consideration the casing drift ID and the manufacturing tolerances of the patch. **External DSPR:** External DSPR at 68 degF [20 degC] when the patch is set in a casing with cylindrical geometry.

■ Reduced safety margin for setting pressure and patch expansion ratio.

10³/₄-in Patches (Standard and HT)



External DSPR up to
1,005 psi [69 bar]



Up to 482 degF
[250 degC]

Patch model	RIH OD, in [mm]
	Steel grade
	Elastomer type and thickness
	Steel thickness, in [mm]

Casing size, in [mm]	10 ³ / ₄ [273.05]							11 ³ / ₄ [298.45]				
Casing weight, lbm/ft [kg/m]	71.10 [105.81]	65.70 [97.77]	60.70 [90.33]	55.50 [82.59]	51.00 [75.90]	45.50 [67.71]	40.50 [60.27]	71.00 [105.66]	65.00 [96.73]	60.00 [89.29]	54.00 [80.36]	47.00 [69.94]
Casing ID, in [mm]	9.450 [240.03]	9.560 [242.82]	9.660 [245.36]	9.760 [247.90]	9.850 [250.19]	9.950 [252.73]	10.050 [255.27]	10.586 [268.88]	10.682 [271.32]	10.772 [273.61]	10.880 [276.35]	11.000 [279.40]
Casing drift, in [mm]	9.294 [236.06]	9.404 [238.86]	9.504 [241.40]	9.604 [243.94]	9.694 [246.22]	9.794 [248.76]	9.894 [251.30]	10.430 [264.92]	10.526 [267.35]	10.616 [269.64]	10.724 [272.38]	10.844 [275.43]

10 ³ / ₄ -in, Slimline	9.291 [236]	321 SS	HNBR, 0.118 in [3 mm]	0.196 [5]	Setting data														
					Expansion pressure, psi [bar]	3,220 [222]	3,370 [232]	3,500 [242]	3,580 [247]	3,650 [251]	3,720 [257]	3,790 [262]	4,200 [290]	4,270 [294]	4,340 [299]	4,420 [305]	4,500 [310]		
					Geometry when set	Loss of diameter, in [mm]	0.636 [16.16]	0.631 [16.04]	0.627 [15.93]	0.623 [15.83]	0.620 [15.74]	0.616 [15.64]	0.593 [15.07]	0.590 [14.99]	0.588 [14.92]	0.584 [14.84]	0.581 [14.75]		
						Patch nominal ID, in [mm]	8.821 [224.04]	8.935 [226.95]	9.039 [229.59]	9.143 [232.23]	9.236 [234.60]	9.340 [237.24]	9.444 [239.87]	9.998 [253.94]	10.097 [256.45]	10.189 [258.81]	10.300 [261.63]	10.424 [264.76]	
						Patch drift ID, in [mm]	8.658 [219.90]	8.772 [222.82]	8.876 [225.46]	8.981 [228.11]	9.074 [230.48]	9.178 [233.12]	9.282 [235.76]	9.836 [249.84]	9.935 [252.36]	10.028 [254.72]	10.140 [257.54]	10.263 [260.68]	
Differential service pressure rating (DSPR)	External DSPR, psi [bar]	1,005 [69]	975 [67]	948 [65]	922 [64]	900 [62]	877 [60]	854 [59]	747 [51]	730 [50]	714 [49]	696 [48]	677 [47]						

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 2,550 psi [175 bar] internally and between 20 and 130 psi [1 and 9 bar] externally.

Notes: **Expansion pressure:** Differential pressure applied to the inflatable packer to set and seal the patch. Values are calculated at 68 degF [20 degC] and are lower at higher temperatures. **Loss of diameter:** Loss of diameter between Patch drift ID and casing drift ID. **Patch nominal ID:** Patch ID when the patch is set in nominal ID tubular. **Patch drift ID:** Takes into consideration the casing drift ID and the manufacturing tolerances of the patch. **External DSPR:** External DSPR at 68 degF [20 degC] when the patch is set in a casing with cylindrical geometry.

□ RIH clearance <0.125 in [3 mm] with casing drift ID.

13³/₈-in Patches (Standard and HT)



External DSPR up to
619 psi [43 bar]



Up to 482 degF
[250 degC]

Patch model	RIH OD, in [mm]
	Steel grade
	Elastomer type and thickness
	Steel thickness, in [mm]

Casing size, in [mm]	13 ³ / ₈ [339.72]						
Casing weight, lbm/ft [kg/m]	80.70 [120.09]	77.00 [114.59]	72.00 [107.15]	68.00 [101.19]	61.00 [90.78]	54.50 [81.10]	48.00 [71.43]
Casing ID, in [mm]	12.215 [310.26]	12.275 [311.78]	12.347 [313.61]	12.415 [315.34]	12.515 [317.88]	12.615 [320.42]	12.715 [322.96]
Casing drift, in [mm]	12.059 [306.30]	12.119 [307.82]	12.191 [309.65]	12.259 [311.37]	12.359 [313.91]	12.459 [316.45]	12.559 [318.99]

13 ³ / ₈ -in, Internal Pressure	10.984 [279]	321 SS	HNBR, 0.118 in [3 mm]	0.118 [3]	Setting data	Expansion pressure, psi [bar]	2,857 [197]	2,886 [199]	2,915 [201]	2,958 [204]	3,002 [207]	3,045 [210]	3,103 [214]
					Geometry when set	Loss of diameter, in [mm]	0.457 [11.62]	0.456 [11.58]	0.455 [11.55]	0.453 [11.51]	0.451 [11.46]	0.449 [11.41]	0.448 [11.37]
						Patch nominal ID, in [mm]	11.761 [298.73]	11.822 [300.28]	11.895 [302.14]	11.965 [303.90]	12.067 [306.49]	12.168 [309.08]	12.270 [311.67]
						Patch drift ID, in [mm]	11.601 [294.68]	11.663 [296.23]	11.736 [298.10]	11.805 [299.86]	11.907 [302.45]	12.009 [305.04]	12.111 [307.62]
					Differential service pressure rating (DSPR)	External DSPR, psi [bar]	181 [13]	179 [12]	176 [12]	173 [12]	169 [12]	165 [11]	162 [11]

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 1,290 psi [88 bar] internally and approximately 21 psi [2 bar] externally.

13 ³ / ₈ -in, Slimline	11.14 [283.0]	321 SS	HNBR, 0.118 in [3 mm]	0.196 [5]	Setting data	Expansion pressure, psi [bar]	3,727 [257]	3,770 [260]	3,814 [263]	3,857 [266]	3,930 [271]	4,002 [276]	4,075 [281]
					Geometry when set	Loss of diameter, in [mm]	0.610 [15.49]	0.608 [15.45]	0.606 [15.40]	0.604 [15.35]	0.601 [15.28]	0.599 [15.21]	0.596 [15.14]
						Patch nominal ID, in [mm]	11.610 [294.88]	11.671 [296.45]	11.745 [298.33]	11.815 [300.10]	11.918 [302.71]	12.020 [305.32]	12.123 [307.92]
						Patch drift ID, in [mm]	11.449 [290.80]	11.511 [292.37]	11.585 [294.25]	11.655 [296.03]	11.757 [298.64]	11.860 [301.24]	11.963 [303.85]
					DSPR	External DSPR, psi [bar]	619 [43]	611 [42]	602 [42]	594 [41]	582 [40]	570 [39]	558 [39]

For a hole or perforation ≤1 in [≤2.54 cm] the patch restores the casing characteristics up to a maximum internal DSPR of 14,500 psi [1,000 bar]. DSPR on parted pipe >12 in [>30 cm] is 2,010 psi [138 bar] internally and approximately 100 psi [7 bar] externally.

Notes: **Expansion pressure:** Differential pressure applied to the inflatable packer to set and seal the patch. Values are calculated at 68 degF [20 degC] and are lower at higher temperatures. **Loss of diameter:** Loss of diameter between Patch drift ID and casing drift ID. **Patch nominal ID:** Patch ID when the patch is set in nominal ID tubular. **Patch drift ID:** Takes into consideration the casing drift ID and the manufacturing tolerances of the patch. **External DSPR:** External DSPR at 68 degF [20 degC] when the patch is set in a casing with cylindrical geometry.

■ Reduced safety margin for setting pressure and patch expansion ratio.

Extreme-HT Expandable Steel Patches



Collapse pressure up to 2,250 psi [155 bar]



Up to 662 degF [350 degC]

Extreme-HT patches are a permanent solution to repair a zone of damaged casing or casing couplings. They are specially designed for steam-assisted gravity drainage (SAGD), cyclic steam stimulation (CSS), and geothermal wells. These expandable tubulars are made from high-quality stainless steel to resist severe temperature and corrosion conditions. The steel is covered with an expandable packing seal made of

graphite and high-temperature PTFE. This material selection enables the patch to seal effectively at low and high temperatures (i.e., through thermal cycling) and in different mediums, such as water, vapor, and nitrogen.

Saltel Extreme-HT Expandable Steel Patch Specifications

Casing size, in [mm]	7 [177.8]	9½ [244.5]	11¼ [298.5]	13% [339.7]
Casing weight, lbm/ft [kg/m]	23 [34.23]	40 [59.53]	60 [89.29]	61 [90.78]
Casing drift ID, in [mm]	6.24 [158.52]	8.679 [220.44]	10.616 [269.64]	12.359 [313.91]
Run-in-hole OD, in [mm]	6.102 [155]	8.346 [212]	9.763 [248]	11.614 [295]
Drift ID after setting, in [mm]	5.47 [138.98]	8.01 [203.49]	9.96 [253.04]	11.69 [296.94]
Internal service pressure	For holes or leaks ≤1 in [≤25 mm], the patch will restore original casing characteristics.			
Thermal cycling	Designed for thermal wells and qualified through 10 cycles under ISO 14310 with water or steam and temperature cycling Cold cycle: 3,046-psi [210-bar] internal pressure at 140 degF [60 degC] with water medium Hot cycle: 2,031-psi [140-bar] internal pressure at 635 degF [335 degC] with steam medium			
Collapse pressure at 167 degF [75 degC], psi [bar]	2,250 [155]	1,100 [76]	825 [57]	680 [47]
Collapse pressure at 662 degF [350 degC], psi [bar]	1,320 [91]	580 [40]	450 [31]	375 [26]

Prefracturing Expandable Steel Patches



Internal DSPR up to
10,000 psi [690 bar]



Up to 302 degF
[150 degC]

Saltel prefracturing patches restore casing integrity to allow high fracturing pressures across damaged completions, such as leaking DV tools, split casings, or damaged frac ports that open prematurely. They ensure minimal loss of ID, providing access for frac plugs and balls. These expandable tubulars are made from high-quality stainless steel and have an elastomer outer skin with a profiled sealing system that conforms to varying IDs.

Patch model	RIH OD, in [mm]	Steel central tube	Elastomer type and thickness	Steel extremity	Casing size, in [mm]	4½ [114.3]					
					Casing weight, lbf/ft [kg/m]	15.10 [22.47]	13.50 [20.09]	12.60 [18.75]	11.60 [17.26]	10.50 [15.63]	9.50 [14.14]
					Casing ID, in [mm]	3.826 [97.18]	3.920 [99.57]	3.958 [100.53]	4.000 [101.60]	4.052 [102.92]	4.090 [103.89]
					Casing drift, in [mm]	3.701 [94.01]	3.795[96.39]	3.833 [97.36]	3.875 [98.43]	3.927 [99.75]	3.965 [100.71]

4½-in. Prefracturing	3.622 [92]	321 SS, 3.622 × 0.157 in [92 × 4 mm]	HNBR, 0.059 in [1.5 mm]	316L SS, 3.385 × 0.118 in [86 × 3 mm]	Setting data	Expansion pressure, psi [bar]	6,380 [440]	6,810 [470]	6,960 [480]	7,070 [487]	7,070 [487]	7,330 [505]
					Geometry when set	Patch nominal ID, in [mm]	3.471 [88.16]	3.570 [90.67]	3.609 [91.68]	3.654 [92.80]	3.708 [94.19]	3.748 [95.20]
						Patch drift ID at extremities, in [mm]	3.339 [84.80]	3.438 [87.33]	3.478 [88.35]	3.522 [89.47]	3.577 [90.86]	3.617 [91.87]
						Patch drift ID for central tube, in [mm]	3.316 [84.22]	3.415 [86.74]	3.455 [87.76]	3.499 [88.88]	3.554 [90.27]	3.594 [91.28]
Differential service pressure rating (DSPR)	Internal DSPR	The prefracturing patch will restore the frac port or casing integrity up to a maximum internal differential pressure of 10,000 psi [689 bar].										
	External DSPR	During hydraulic fracturing or injection, there should be no external differential pressure, therefore zero risk of collapsing the patch. However subsequently when the well flows back, there may be a risk of collapse. When applicable, it is recommended to shoot perforations through the patch once the fracturing or injection is completed. This eliminates all risk of collapsing the patch. If not applicable, please contact your sales representative. The geometry of the frac port and the fracturing or injection pressure will be necessary to calculate the external DSPR.										

Notes: **Expansion pressure:** Differential pressure applied to the inflatable packer to set and seal the patch; values calculated at 68 degF [20 degC] and are lower at higher temperatures.

Patch nominal ID: Patch ID when the patch is set in nominal ID tubular. **Patch drift ID:** Takes into consideration the casing drift ID and the manufacturing tolerances of the patch. **External DSPR:** External DSPR at 68 degF [20 degC] when the patch is set in a casing with cylindrical geometry.



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