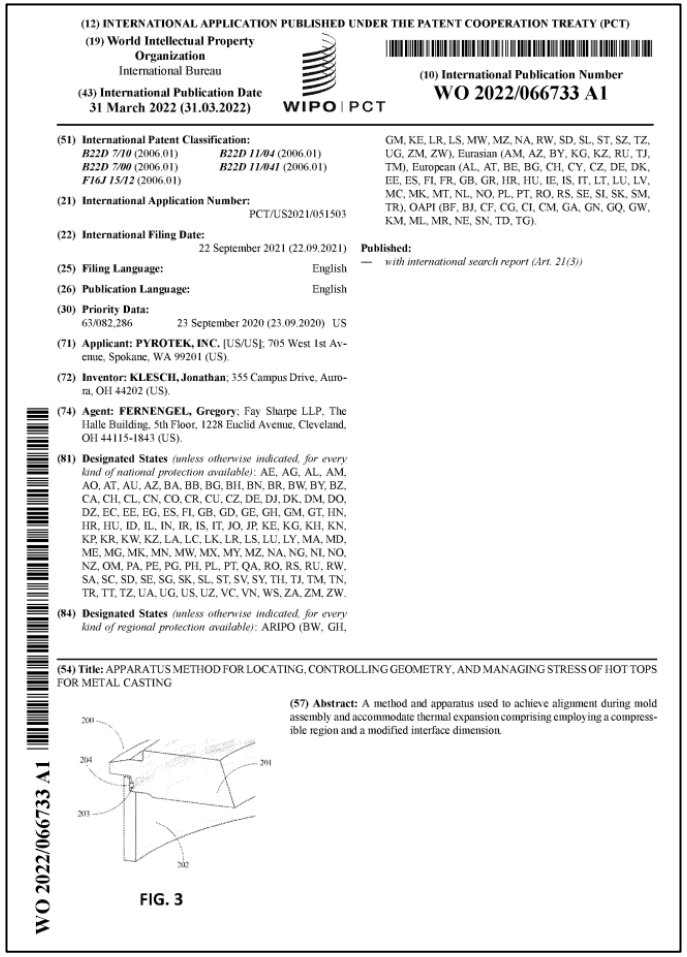
Pyrotek RING-FIT Transition Plates

Mahmud (Moe) El khoja

Pyrotek Ring-Fit Transition Plates

Is It Unique?



(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
31 March 2022 (31.03.2022)

WIPO | PCT

(10) International Publication Number
WO 2022/066733 A1

(51) International Patent Classification:
B22D 7/10 (2006.01) *B22D 11/04* (2006.01)
B22D 7/00 (2006.01) *B22D 11/041* (2006.01)
F16J 15/12 (2006.01)

(21) International Application Number:
PCT/US2021/051503

(22) International Filing Date:
22 September 2021 (22.09.2021)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/082,286 23 September 2020 (23.09.2020) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) Title: APPARATUS METHOD FOR LOCATING, CONTROLLING GEOMETRY, AND MANAGING STRESS OF HOT TOPS FOR METAL CASTING

(57) Abstract: A method and apparatus used to achieve alignment during mold assembly and accommodate thermal expansion comprising employing a compressible region and a modified interface dimension.

200 204 201 203 202

FIG. 3

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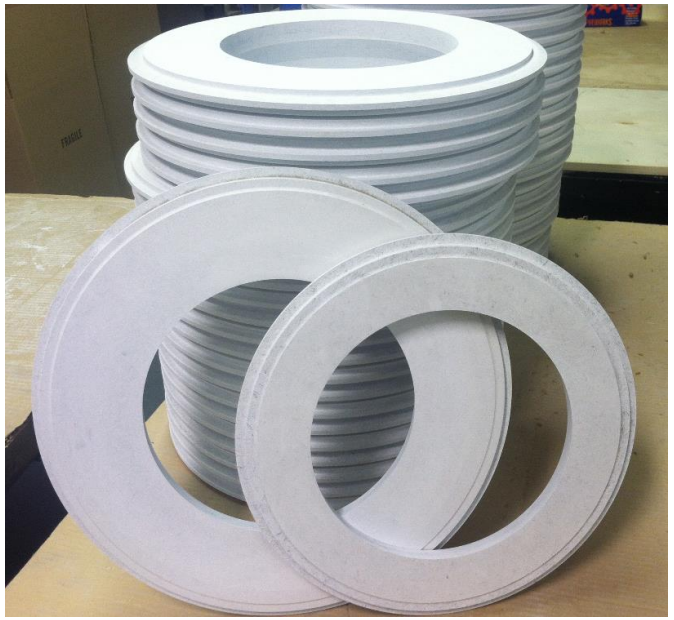
A patent titled " Apparatus Method for Locating, Controlling Geometry, and Managing Stress of Hot Tops for Metal Casting" is pending for this technology.

https://www.pyrotek.com/patents/

Pyrotek Transition Plates

What is a Transition Plate?

Pyrotek Transition Plates are replaceable ceramic components installed in both vertical direct chill (VDC) and horizontal direct chill (HDC) billet mould assemblies. They create the leading boundary of the mould before primary solidification at the casting ring.



Pyrotek Ring-Fit Transition Plates

What Are The Problems?

1. Direct chill billet casting mold technologies create an **extreme environment** for the transition plate with significant temperature differences between molten aluminium and hydronically cooled moulds. That thermal gradient generates **intense thermal stress** on the component.
2. Transition plate materials have inherent **mechanical property variations** since they are manufactured in large formats. These variations **increase the risk of premature failure**.
3. Equipment manufacturer's insist transition plates are made to their **geometric specifications**. These specifications properly fit the transition plates into the mold assemblies, but they often **compromise performance** of the selected materials.

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Pyrotek Ring-Fit Transition Plates

How Do We Solve The Problems?

Objective: Utilize existing materials to **improve fit** and **reliability**.

Option 1

Redesign moulds to eliminate stress?

Option 2

Develop improved material to overcome variation and either withstand or reduce stress?

Option 3

Develop a method to accommodate material variation by reducing stress?

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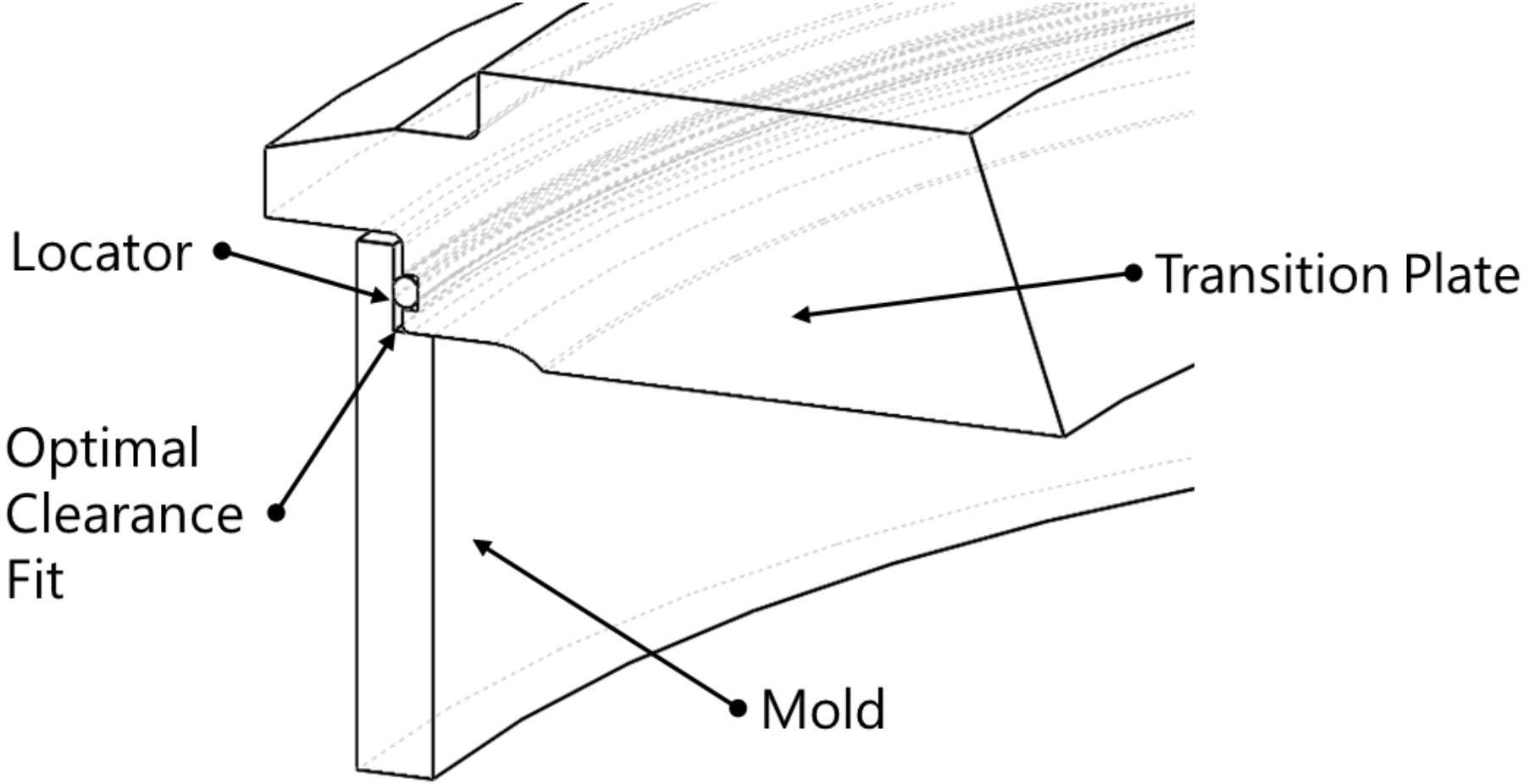
Pyrotek Ring-Fit Transition Plates

How Does It Work?



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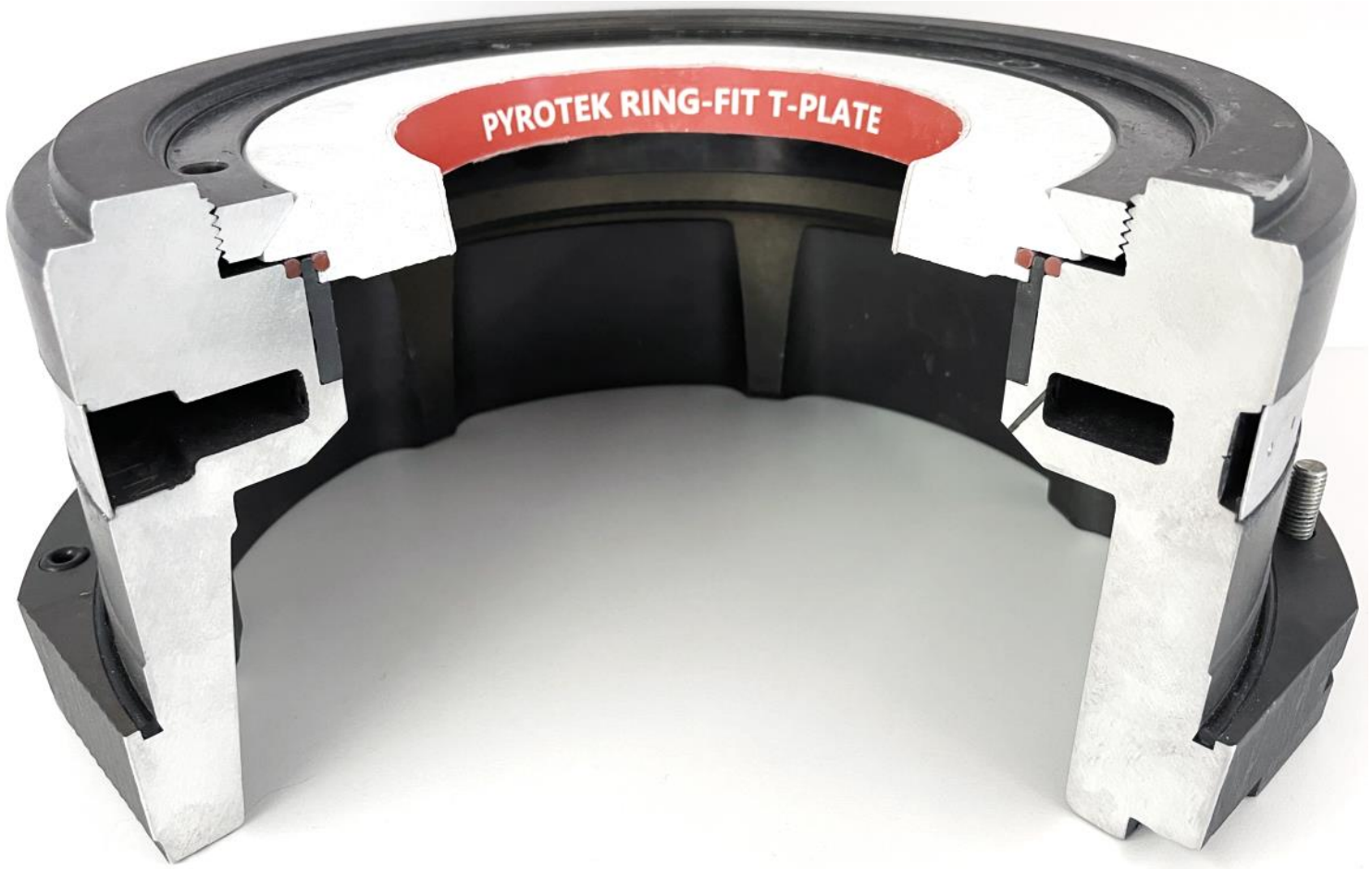
Does It Improve The Fit?



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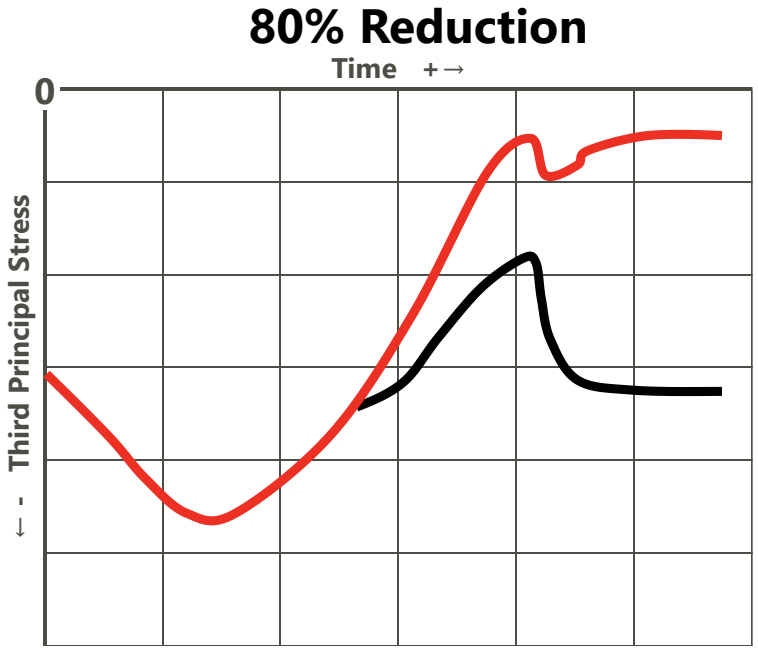
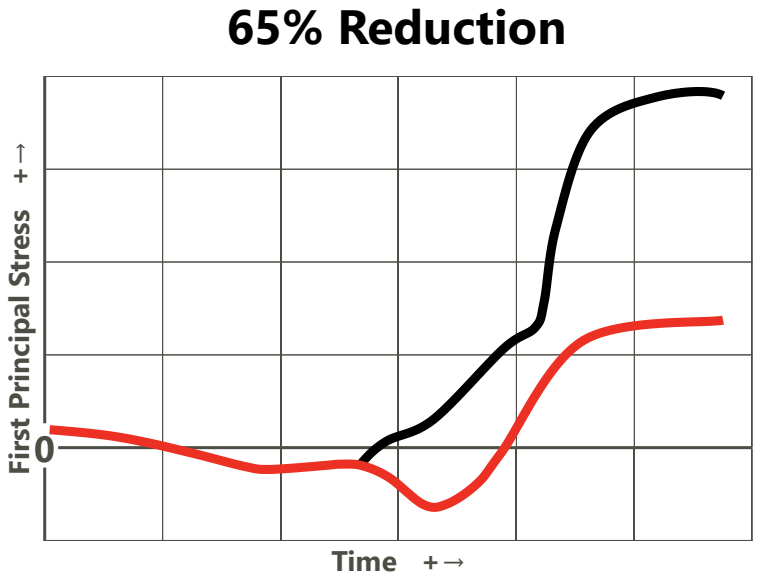
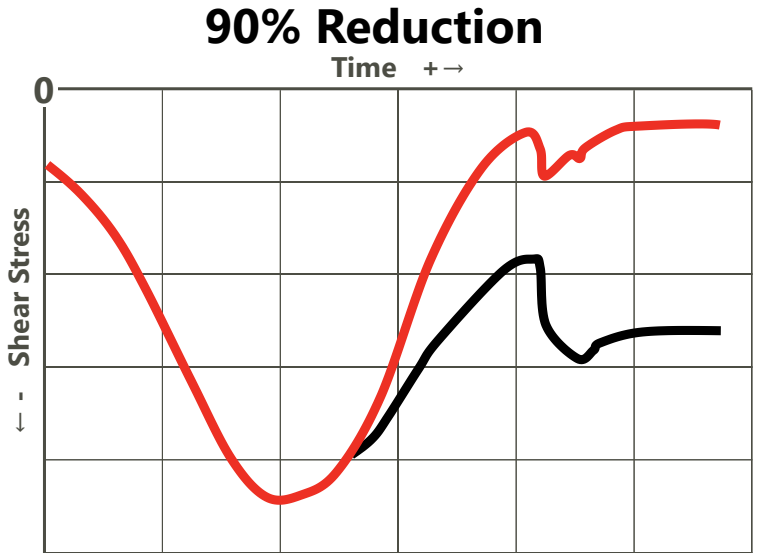
Does It Reduce Stress?







Pyrotek Ring-Fit

OEM Design

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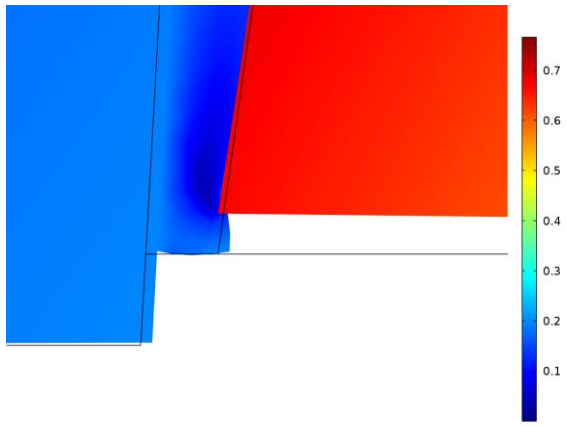
Pyrotek Ring-Fit Transition Plates

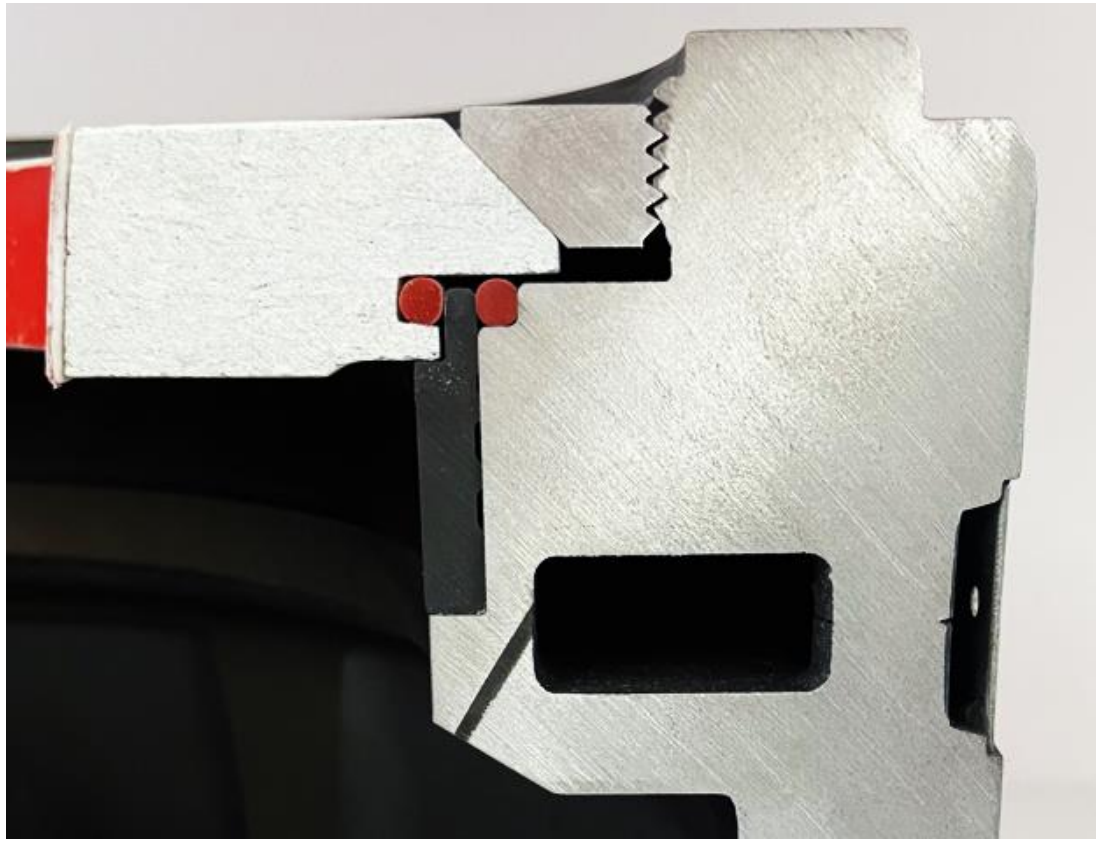
Does It Have Other Benefits?

+ **Reduce heat loss** near primary solidification by changing the heat transfer mode to convection from conduction.

+ **Reduce casting lubricant penetration** with additional seal at the locator.

+ **Reduce gasket maintenance** by minimizing distortion of the transition plate during operation.





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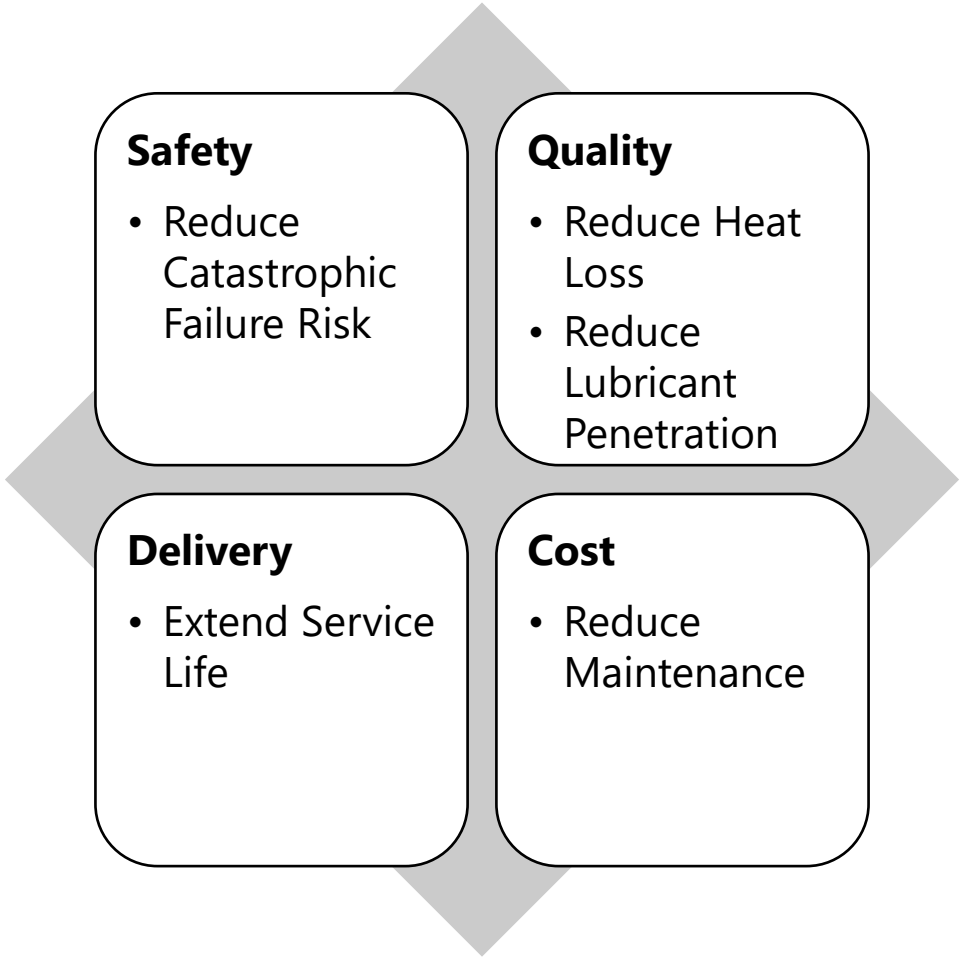
Pyrotek Ring-Fit Transition Plates

What Can It Do For The User?



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Pyrotek Ring-Fit Transition Plates

Does It Work?

16,000 Successful Casts and Counting

- Proven Wagstaff® AirSlip® and NuMax™ Performance
- Verified Improvement in Billets 178mm to 381mm

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Questions?

Pyrotek®