# Table of Contents

1. Capabilities
2. Our History
3. Material Specifications
4. Definitions
5. Terms & Conditions
6. Casting Specifications & Guarantee

<table>
<thead>
<tr>
<th>MANHOLE COVERS &amp; FRAMES</th>
<th>TYPICAL INSTALLATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1090</td>
<td>10</td>
</tr>
<tr>
<td>P-1090 R/G</td>
<td>11</td>
</tr>
<tr>
<td>P-1090 Heavy Duty</td>
<td>12</td>
</tr>
<tr>
<td>P-1001</td>
<td>16</td>
</tr>
<tr>
<td>P-9500, P-9501, P-9503, P-9504</td>
<td>19</td>
</tr>
<tr>
<td>P-1002</td>
<td>18</td>
</tr>
<tr>
<td>P-1003</td>
<td>19</td>
</tr>
<tr>
<td>P-1005, P-1006</td>
<td>20</td>
</tr>
<tr>
<td>P-1007</td>
<td>21</td>
</tr>
<tr>
<td>P-1008, P-1009, P-1010</td>
<td>22</td>
</tr>
<tr>
<td>Frame for P-1001, P-1005 &amp; P-1006</td>
<td>23</td>
</tr>
<tr>
<td>P-1015, P-1016</td>
<td>24</td>
</tr>
<tr>
<td>P-1018, P-1020</td>
<td>25</td>
</tr>
<tr>
<td>P-1022, P-1023, P-1024</td>
<td>26</td>
</tr>
<tr>
<td>P-1025, P-1026</td>
<td>31</td>
</tr>
<tr>
<td>P-1027, P-1028</td>
<td>32</td>
</tr>
<tr>
<td>P-1029, P-1030</td>
<td>33</td>
</tr>
<tr>
<td>P-1035</td>
<td>34</td>
</tr>
<tr>
<td>P-1036, P-1037</td>
<td>35</td>
</tr>
<tr>
<td>P-1038</td>
<td>36</td>
</tr>
<tr>
<td>P-1045</td>
<td>40</td>
</tr>
<tr>
<td>P-1046</td>
<td>40</td>
</tr>
<tr>
<td>P-1042, P-1043</td>
<td>39</td>
</tr>
<tr>
<td>P-1047-50, (Bell Telephone Type)</td>
<td>41</td>
</tr>
<tr>
<td>P-1051-54 (Underground Electrical, PG&amp;E)</td>
<td>42</td>
</tr>
<tr>
<td>P-1053</td>
<td>42</td>
</tr>
<tr>
<td>P-1056</td>
<td>55</td>
</tr>
<tr>
<td>P-1057</td>
<td>55</td>
</tr>
<tr>
<td>P-1065-69 (Sidewalk &amp; Light Duty Manholes)</td>
<td>57</td>
</tr>
<tr>
<td>P-1058, P-1060, P-1061, (Small Round Grate)</td>
<td>56</td>
</tr>
<tr>
<td>P-1075, P-1077</td>
<td>58</td>
</tr>
<tr>
<td>P-1078</td>
<td>59</td>
</tr>
<tr>
<td>P-1079, P-1080</td>
<td>59</td>
</tr>
<tr>
<td>P-1081</td>
<td>60</td>
</tr>
<tr>
<td>P-1082, P-1083</td>
<td>60</td>
</tr>
<tr>
<td>P-1084 Cover</td>
<td>61</td>
</tr>
<tr>
<td>P-1084 Frame</td>
<td>62</td>
</tr>
<tr>
<td>P-1088 Cover</td>
<td>63</td>
</tr>
<tr>
<td>P-1087 Frame</td>
<td>64</td>
</tr>
<tr>
<td>ID</td>
<td>Description</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>58</td>
<td>P-2001 MONUMENT &amp; FRAME</td>
</tr>
<tr>
<td>59</td>
<td>PJ-1116 &amp; PJ1117 BELL TYPE RING &amp; GRATE</td>
</tr>
<tr>
<td>60</td>
<td>PJ-1114 &amp; PJ-1115</td>
</tr>
<tr>
<td>61</td>
<td>P-2501, P-2502 &amp; P-2503 LAMPHOLES</td>
</tr>
<tr>
<td>62</td>
<td>P-2505-08 LAMPHOLES</td>
</tr>
<tr>
<td>63</td>
<td>P-3010-18 TRENCH RAILS &amp; GRATES</td>
</tr>
<tr>
<td>64</td>
<td>P-3201-09</td>
</tr>
<tr>
<td>65</td>
<td>P-4001-3</td>
</tr>
<tr>
<td>66</td>
<td>P-4101-9</td>
</tr>
<tr>
<td>67</td>
<td>P-4201-23</td>
</tr>
<tr>
<td>68</td>
<td>P-4301-23</td>
</tr>
<tr>
<td>69</td>
<td>P-4601, P-4602</td>
</tr>
<tr>
<td>70</td>
<td>P-4611</td>
</tr>
<tr>
<td>71</td>
<td>P-4612</td>
</tr>
<tr>
<td>72</td>
<td>P-4701, P4702</td>
</tr>
<tr>
<td>73</td>
<td>P-5001-3</td>
</tr>
<tr>
<td>74</td>
<td>P-5101-3</td>
</tr>
<tr>
<td>75</td>
<td>ALAMEDA FLOOD CONTROL STANDARD MANHOLE</td>
</tr>
<tr>
<td>76</td>
<td>P-6001 INLET FRAMES &amp; GRATES</td>
</tr>
<tr>
<td>77</td>
<td>P-6002, P-6003</td>
</tr>
<tr>
<td>78</td>
<td>P-6004, P-6005</td>
</tr>
<tr>
<td>79</td>
<td>P-6006, P-6007, P-6008</td>
</tr>
<tr>
<td>80</td>
<td>P-6101, P-6102</td>
</tr>
<tr>
<td>81</td>
<td>P-6103, P-6104</td>
</tr>
<tr>
<td>82</td>
<td>P-6201-5, P-6211, P-6212, P-6221</td>
</tr>
<tr>
<td>83</td>
<td>P-6701, P-6702 CATCHBASIN</td>
</tr>
<tr>
<td>84</td>
<td>P-7001</td>
</tr>
<tr>
<td>85</td>
<td>P-7002-4</td>
</tr>
<tr>
<td>86</td>
<td>P-7101-4</td>
</tr>
<tr>
<td>87</td>
<td>P-8001-4</td>
</tr>
<tr>
<td>88</td>
<td>P-9001</td>
</tr>
<tr>
<td>89</td>
<td>P-9101-2</td>
</tr>
<tr>
<td>90</td>
<td>P-9103-4</td>
</tr>
<tr>
<td>91</td>
<td>P-9501-4</td>
</tr>
<tr>
<td>92</td>
<td>P-9601-8</td>
</tr>
<tr>
<td>93</td>
<td>STAR WASHER</td>
</tr>
</tbody>
</table>
CONSTRUCTION CASTINGS

Manhole Covers & Frames
Monuments
Park Benches
Tree Grates
Trench Rails & Grates
Decorative Architectural Castings
Bollards
Lampholes
Catchbasins
Inlets
Extension Rings
Wheel Guards
Airport Castings
Dock Castings
Kiosk Benches
Newell Posts with Decorative Tops

INDUSTRIAL CASTINGS

We can produce various castings for many types of industry. Castings can be produced with your existing patterns, or we can provide you with new patterns based on your drawings. Industrial castings can be for a new design or to replace odd/broken parts.

Some of the industries that we supply include:
- Fiber Optics
- Computer Industry
- Chemical & Petroleum Refineries
- Light Standards
- Maritime
- Gearbox Housing
- Engine Casting

CUSTOM CASTINGS

Specially sized manhole covers
Specially machined castings
Architectural elements
Casts made out of a specific metal or alloy,
Odd sized extension rings
Weight load requirements
Hot-Dip Galvanizing
Custom patterns
Prototype castings
Restoration castings
Decorative light poles
Artwork (NO lost wax)
Ornamental

BUSHINGS, BEARINGS & BILLETS

We offer bushings in almost any size. They are centerfugally cast in gray iron, ductile iron and bronze. Our bushings are guaranteed to be free of porosity.

PLAQUES.
Available in Bronze & Aluminium.
For over a century our foundry has cast some remarkable pieces of Bay Area history. Phoenix Iron Works was established by William Russell in Oakland California in 1901 and continues today still under the guidance of Russell family members.

Phoenix Iron made the cast iron propellers that powered the ferries that served the bay area for many decades. William employed two of his brothers, Tom & Roy; one of which was the pattern maker. William was succeeded by his brother Sam Russell who work with his brother George Russell. Sam added a machine shop to the foundry's capacities. In just a few years, Phoenix rose to become one of the major suppliers of manhole covers to Northern California.

After Sam’s passing, Phoenix Iron was run by his sons Weldon Russell and Clayton Russell. They began expanding the product line and adding ductile iron, aluminum and brass into their foundry's capacities. Soon, the works had a steel fabrication and galvanizing operation in place along with an on-site pattern making department. The Russell family is dedicated to providing their customers with a full range of foundry services for all their casting needs. In 1988, Weldon's daughter Carol Russell came aboard to run the sales department of Phoenix Iron Works and is the current contact today. She's the fourth generation of the Russell family at Phoenix Iron Works.

Phoenix Iron Works is listed by name in many of the specifications for Cities and Counties on the West Coast. You'll commonly see our Manholes and Grates on numerous streets scattered all around Northern California.

Some of our landmark jobs include:

- The Ornate “Path of Gold” light poles that line Market Street in San Francisco.
- The Ornate facade of the legendary Palace Hotel in San Francisco.
- The light housings that illuminate the span and towers of the Golden Gate Bridge.
- The “Necklace of Lights” that surround Lake Merrit, in Oakland.
- Numerous time capsules and their bronze plaques have been cast for many cities.
Material Specifications

To which the Phoenix Iron Works' construction castings shall conform, specifically to ensure consistent high quality and dependability.

<table>
<thead>
<tr>
<th>SPECIFYING BODY</th>
<th>SPECIFICATION NUMBER</th>
<th>CLASS</th>
<th>MINIMUM TENSILE STRENGTH- PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM</td>
<td>A-659-64-T</td>
<td>G-3000</td>
<td>30,000</td>
</tr>
<tr>
<td>SAE</td>
<td>J-431-A</td>
<td>G3000+</td>
<td>30,000</td>
</tr>
<tr>
<td>FEDERAL</td>
<td>QQI-653</td>
<td>30</td>
<td>30,000</td>
</tr>
<tr>
<td>ASTM</td>
<td>A-536-65-T</td>
<td>80-55-06</td>
<td>80,000</td>
</tr>
<tr>
<td>U.S. MILITARY</td>
<td>MIL-11466</td>
<td>4</td>
<td>80,000</td>
</tr>
<tr>
<td>ASTM</td>
<td>A-27</td>
<td>ALLOY 30-60</td>
<td>60,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ALLOY 33-35</td>
<td>65,000</td>
</tr>
</tbody>
</table>

Gray Iron
Ductile Iron
Cast Steel

Note: Unless alternate metal specification is designated, all castings shall conform to one of the specifications in the above tables.

Quality Assurance

Phoenix Iron Works castings shall be of uniform quality, free of blowholes, porosity, hard spots, shrinkage, distortion or other defects. The finish shall meet industry standards and will be cleaned by shotblasting.
Definitions

**Ordering** To minimize error, use the CATALOGUE NUMBER and specify part or parts desired. Other ordering procedures necessary for clarification are found in "Note" Section of each page.

**Machining** Machining of casting surfaces when designated will be to V-125 RMS finish specification unless otherwise specified on drawing or in "note" section.

**Weights** Weights used in catalogue are approximations based on averages drawn from random samplings. Weights are subject to change due to variations in design. All weights are in US imperial pounds unless otherwise stated.

**Dimensions** Dimensions are in US imperial inches unless otherwise stated and subject to manufacturer's tolerances.

**Ground to Fit** Horizontal bearing surfaces shall be ground to match evenly through use of grinding pages.

**Light Duty** Designed for pedestrian traffic areas ONLY.

**Heavy Duty** Designed for roadway and highway traffic H-20 loading as prescribed by the State of California CALTRANS.

**Extra-Heavy Duty** Designed for airport traffic and other areas requiring unusually high loadings.

**Illustrations** All illustrations, descriptions and detailed dimensions describe standard features and do not indicate any variations available. Drawings are not necessarily to scale.
TERMS & CONDITIONS

1. Unless otherwise agreed, quotations must be accepted and patterns furnished to the foundry within thirty (30) days from the date of quotation.
2. All castings are sold on rough castings F.O.B. cars, foundry point. Terms-Net Cash-No discount unless otherwise specified.
3. Claims for error in weight or number must be made within ten (10) days after the receipt of castings.
4. Foundry is responsible for the replacement of castings rejected due to foundry defects and such castings must be reported within ninety (90) days after their receipt.
5. Foundry is responsible for machine work, welding, labor charges or other losses or damages caused by defective castings unless otherwise agreed in writing.
6. Foundry shall not be liable for damages for failure to deliver as a result of fires, strikes, differences with employees, accidents or other causes beyond its control.
7. In the event that legal action is commenced to enforce or interpret the parties' agreement regarding the subject matter hereof, the prevailing party in such action shall be entitled to recover its reasonable attorney's fees incurred in connection with such action and to a judgment including an award for such attorney's fees.

Trade Customs Quotations

1. Blueprints submitted for estimating purposes should be marked with rough casting weight, if known, or an estimated weight upon which quotation will be based. A detailed description of the pattern equipment should be furnished.
2. When quotations involve the making of a piece, prices, definite weights shall be established and agreed upon. Quotations shall be subject to revision on any variation from the established weights.
3. Unless otherwise specified by the foundry, quotations are based on castings with gates, fins and other projections removed to approximately the contour of the pattern.

All Quotations are made and all castings are sold upon the following terms & conditions

ORDERS

4. No order shall be changed unless notice of revision is made and accepted in writing before work is in process. If work is in process, customer is to be charged for any castings made as well as the cost of the cores, molds or equipment discarded because of such changes.
5. Cancellations of orders are to be made only the mutual consent of buyer and seller.
6. Unless otherwise stipulated, the customer shall accept an overrun of ten percent above quantities specified on order. However, the foundry is to make an effort at all times to furnish near the exact quantity specified as operating conditions will permit.
7. If the customer requires special production service to secure unusual deliveries, an extra charge shall be made.

Patterns and Core Box Equipment

8. Customer must supply the equipment in condition to produce economically the quality and quantity of castings required.
9. An extra charge will be made if patterns require stopping off or if skeleton or sweep pattern equipment is furnished.
10. Foundry is not responsible for variations existing between blueprints and equipment supplied by customer.
11. All patterns core boxes and loose pieces thereof should be marked properly for identification.
12. Follow boards, core driers and similar devices when required are to be furnished by customer.
13. Repairs and changes to patterns by customer's orders will be made at the expense of the customer.
14. All freight, dunnage, boxing and crating charges on patterns, both to and from the foundry, shall be assumed by the customer.
Custom Casting
Creating Something New

We can work with you to create a specialty casting to fit your needs. Some examples of special requirements we have filled in the past for custom work include:

- Precise weight loadings
- Very tight dimensional tolerances
- Replicating historic castings from an original surviving example
- Pouring special metal alloys
- Coating our castings with finishes or galvanizing when needed
- Replicating special markings or designs on a casting
- Performing chemical and physical reports as needed.

Fixing Old Problems

With time and wear through use, even the most resilient casting will need replacement. With our capabilities, we can keep the past alive or replace it as needed.

- We are able to make manhole covers to fit a frame that’s already in the ground. (presumably replacing a worn or broken casting made by a defunct foundry)

- We have the capability to make a casting off of existing original castings, rather than having a pattern made. (Note: not always available or possible)
Attention: Cities, Counties, & Water Agencies

Services Provided: We will assist in measuring on site and meet with you to analyze the best solutions

Products:
Manhole Frames, Covers, & Grates in Cast Iron
Monuments, Curb Inlets, Flushing Inlets in Cast Iron
Fabricated Grates in Steel
Environmental Filters for Catch Basins
Water-Tight Covers for Closed Sanitary Sewers
Ornamental Castings and Fabrications for Buildings and Landscaped Areas.

NEW CONSTRUCTION or REPLACEMENT.

REPLACEMENT IS OUR SPECIALTY!
Bushings - Bearings - Billets

We manufacture bushings here at Phoenix Iron Works. We'll custom make almost any size of bushing.


We do stock some assorted sizes. We can rush your order depending on the size of the castings or order. We guarantee that the bushing will be free of porosity. If you do run into pinholes during machining, we'll make a new casting at no cost to you.

It is possible for us to make specialty larger bushings, standard bushing length is 13". We have made them up to 66" and can make them longer. We can have them heat treated or stress relieved. Ask us about any other specific requirements that you might need to satisfy.

O.D. = OUTER DIAMETER
I.D. = INNER DIAMETER
COMPARISON OF PHOENIX P-1090 & TYPICAL MANHOLE SET.

LOADING: Better engineered design using metal in necessary areas allows for much higher loading to insure consistent safety and performance.

MACHINING: Machining both frame and cover on three surfaces to 1/16" clearance on diameter with a 10.5 degree taper results in tight, uniform fit on every set.

NON-ROCKING: Close tolerance machining of frame and cover in addition to the taper, inhibits rocking and shifting when in place.

LESS WEAR: Close tolerance machining helps prevent movement, water seepage and collection of foreign matter which in turn results in significantly less wear.

LIGHT WEIGHT: Our P-1090 is an example of a manhole engineered to take full advantage of the properties of gray iron. This high performance design features a lighter weight and can be provided at a substantial savings to the user due to a reduced material handling and shipping cost.

SKID RESISTANT COVER DESIGN: The ASTM Symposium on skid resistance recommended the grid pattern on cover surface as most skid resistant and least likely during the course of a wheel while stopping. In addition, the grid pattern is superior for pedestrian traffic safety. ASTM Special Publication No. 362, 1962.

PICKHOLE: The pickhole is designed to fit a standard pick only. The angle of and design of the pickhole precludes bars and sticks falling through. This pickhole discourages vandalism, but allows ventilation for standard systems.

EXTENSION RINGS: The close tolerance machining allows on three surfaces of the frame and cover insures engineered fit of rings to frame & cover.

ESTABLISHING STANDARD: The P-1090 uses a 24" clear opening frame with a 4.5" height. Phoenix Iron Works designed our manhole for precast concrete cones manufactured by major producers in the area. This will afford you the advantage of consistency in installation and quality. This set is practical for use in highway traffic, pedestrian traffic & field area. Cost is lowered due to long production runs and less inventorying costs.

LOADING: Misuse of the characteristics of gray iron in the design of a manhole results in less and inconsistent loading capabilities.

MACHINING: Typically machined on one surface, and only leaving a half-inch clearance on diameter does not result in a tight or uniform fit.

ROCKING: Machining with sloppy or loose tolerances on the circumference edge, if any, is done at all, results in a higher chance of rocking and shifting.

WEARING: Excessive gap in the diameter allows for water seepage and the collection of foreign material which causes irregular wear and can present a safety hazard.

EXCESS WEIGHT: Due to poor design and the obsolete assumption that weight equals strength, a cumbersome, lower performance and more expensive manhole, inferior designs persist, so beware!

IMPRactical COVER DESIGN: Cover patterns have been left to the artistic pen of the draftsman, and an innumerable assortment of attractive, but non-functional and potentially hazardous designs exist on the market.

PICKHOLE: Pickholes located on diameter of cover fill up with debris. Simple pickholes located on other areas of cover do not prevent foreign material passing through and often require an expensive dirtpan to catch it.

EXTENSION RINGS: Single surface machining, excessive gap on diameter and manufacturer's freedom in tolerances doesn't allow for a consistently engineered fit in a large variety of sizes.

ESTABLISHING STANDARD: With a large area of freedom in tolerances and manufacturing practices it is difficult to maintain consistency which becomes expensive in maintenance and construction. Wide variety of sometimes specialized designs also becomes a cost issue. Cost is also raised to end user due to short production runs and inventorying expenses.
HIGHER LOADING: The P-1090 meets the requirements of RR-F-621 (b) (25,000 lbs on 9”x9” Area); AASHO H-20 Loading (20,800 lbs on a 2.75” dia max area); Los Angeles County (35,000 lbs on a 16” diameter load area). The P-1090 consistently outperforms heavier ribbed designs on load tests (40,000 lbs on a 6”x4” area).

NON-ROCKING: Other manholes have machining on the bearing surfaces only with an excessive gap between diameter of frame which allows for rocking and shifting. Our P-1090 is machined to close tolerance on three surfaces on both the frame and cover which prohibits rocking and shifting.

CONSISTENT METAL: The metal is controlled ASIM specification A-159-70FG3000 or United States Government Specification QQ-1-653.

INFILTRATION: Under a two-foot head of water, the P-1090 will intake 8 gallons of water per minute. For applications where intake of surface water a critical issue, we suggest the use of our P-1090 R/G Frame & Cover. Under a four-foot head of water, the P-1090 R/G had no measurable intake.

Here's some of over 200 Agencies who have approved the use of our P-1090

CITIES, COUNTIES & STATE AGENCIES

Fairfield, Calif. California Division of Highways
Fremont, Calif. (CALTRANS)
Monterey, Calif. California Office of Architecture
Napa, Calif. & Construction
Redding, Calif. Marin County Sanitary District
Reno, Nevada North Tahoe Public Utility District
Santa Rosa, Calif. San Mateo County
Stockton, Calif. Santa Clara County
Yuma, Arizona Sonoma Sanitation Department
South Tahoe Public Utility District
24" FULL TRAFFIC TYPE NON-ROCKING MANHOLE FRAME & COVER P-1090

P-1001 MANHOLE FRAME
ASTM GRID PATTERN
ONE MAN PICK HOLE
EDGE PRY-HOLE
SEE BELOW
GROUT HOLES 4-EQUALLY SPACED

SANITARY SEWER

MACHINED SURFACES

26 1/4"

25 1/6

1 1/8

1 1/2

4 1/2

9 1/16

31 1/2

24

NEW RIBLESS HEMISPHERICAL COVER DESIGN DESIGNED FOR H-20 HIGHWAY LOADING

SET WEIGHT
COVER = 130
FRAME = 138
TOTAL = 268

DATA:
1. FRAME AND COVER FULLY MACHINED ON 3 SURFACES TO ASSURE INTERCHANGEABILITY AND CLOSE QUIET FIT
2. STANDARD COVER MARKINGS AVAILABLE "SANITARY SEWER", "STORM SEWER", OR BLANK SPECIFY CHOICE ON ORDER
3. SKID RESISTANT COVER DESIGN. REFER TO ASTM SPECIAL PUBLICATION No 326, 1962

5. MANUFACTURED UNDER U. S. PATENT No. 3289556
6. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO ASTM SPECIFICATION A-159-70T-G3000 OR UNITED STATES GOVERNMENT SPECIFICATION QQ-T-653
24" FULL TRAFFIC TYPE NON-ROCKING MANHOLE FRAME & COVER

**P-1090 R/G**

Designed to minimize ground water infiltration

- **P-1001 Manhole Frame**
- **ASTM Grid Pattern**
- **Curved Blind Pickhole (See Below)**
- **Grout Holes 4-Equally Spaced**

**MACHINED SURFACES**

1. **26 1/4"**
2. **25 5/18"**
3. **13 3/8"**
4. **1 1/8"**
5. **4 1/2"**
6. **9 16"**

**DATA:**

1. Frame & cover fully machined on 3 surfaces to assure interchangeability and a close, quiet fit.
2. Standard cover markings available: "SANITARY SEWER", "STORM SEWER", or blank. Please specify choice on order.
3. Skid resistant cover design. Refer to ASTM special publication No. 326, 1962.
5. All material used in manufacturing shall conform to ASTM Specification A-159-70T-G3000 or United States Government Specification QQ-1-653.
6. Proof-Load Test: Meets requirements of federal specification R-R-F-621b (9-14-87) per PAR 4.4.1 and PAR 3.8.1.

---

**PHOENIX IRON WORKS**

P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
MANHOLES - TYPICAL INSTALLATION

CONICAL AND BLOCK STYLE CONSTRUCTION FOR BOTTOM FLANGE MANHOLES

FIELD INLET AND SLAB STYLE CONSTRUCTION FOR TOP FLANGE MANHOLES
PHOENIX IRON WORKS

castings since 1901

STANDARD HEAVY DUTY NON-ROCKING MANHOLE FRAME

P-1001

FRAME AND COVER

SANITARY SEWER

MANUFACTURED UNDER U.S. PATENT NO. 3289556
OTHER PATENTS PENDING

Note: SPECIFY SANITARY SEWER OR STORM SEWER WHEN ORDERING

SET WEIGHT
FRAME - 138
COVER - 182
TOTAL 320

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-84T - G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606

16
PHOENIX IRON WORKS
castings since 1901

STANDARD EXTRA-HEAVY DUTY MANHOLE FRAMES, COVERS AND GRATES FOR AIRPORT CONSTRUCTION TOP FLANGE DESIGN

P-9501 FRAME AND COVER SET WEIGHT 335
P-9502 FRAME AND GRATE SET WEIGHT 335

U.S. GOVERNMENT DESIGN

NOTE: ALL HORIZONTAL BEARING SURFACES MACHINED

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - G2000 OR UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
PHOENIX IRON WORKS

castings since 1901

STANDARD 24" HEAVY DUTY PRESSURE TYPE MANHOLE FRAME AND COVER
P-1002

ASTM GRID PATTERN

P-1090 R/G MANHOLE COVER
MACHINE

P-1002 MANHOLE FRAME

4 BOSSES FOR BOLTING

SANITARY SEWER

CURVED BLIND PICKHOLE

MACHINED SURFACES

1/4" DIA. NEOPRENE "O" RING SEAL

26 1/4"
25 3/4"
1 3/8"
1 1/8"
4 1/2" 4 1/2"
3 1/2"
1"
9/16"

4 1/2" HEX-HEAD STAINLESS STEEL BOL W/COUNTERSUNK HEADS

NEW RIBLESS HEMISPHERICAL COVER DESIGN.
DESIGNED FOR H-20 HIGHWAY LOADING.

DESIGN IS CAPABLE OF 600 POUNDS OF WEIGHT PER SQUARE INCH
WITH OVERALL 43,000 POUNDS ACCEPTABLE LOAD

DATA:
1. FRAME AND COVER FULLY MACHINED ON 3 SURFACES TO ASSURE INTERCHANGEABILITY AND CLOSE, QUIET FIT.
2. STANDARD COVER MARKINGS AVAILABLE: "SANITARY SEWER", "STORM SEWER", OR BLANK. SPECIFY CHOICE ON ORDER.
3. SKID RESISTANT COVER DESIGN. REFER TO ASTM SPECIAL PUBLICATION No. 326, 1962.
4. CASTINGS DIPPED IN ASPHALT PAINT.
5. MANUFACTURED UNDER U.S. PATENT No. 3299558.
6. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO ASTM SPECIFICATION A159-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATION QQ-L-653.
7. PROOF-LOAD TEST MEETS REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-521b (9-14-67) PER PAR 4.4.1 AND PAR 3.8.1.

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
PHOENIX IRON WORKS
castings since 1901

STANDARD 24” HEAVY DUTY NON-ROCKING MANHOLE FRAME AND GRATE

24” CLEAR OPENING

FLOW AREA - 96 SQ. IN.

NOTE:
ALL HORIZONTAL BEARING SURFACES MACHINED - /25 - LOADING 94,000 POUNDS

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-54T - G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
STANDARD 30'' & 36''
HEAVY DUTY NON-ROCKING MANHOLE FRAMES AND COVERS

30'' & 36'' CLEAR OPENING

NOTE:
SPECIFY "TELEPHONE" "ELECTRIC" ORPLAIN COVER LETTERING

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
STANDARD 48” HEAVY DUTY NON-ROCKING MANHOLE FRAME AND DOUBLE COVERS

NOTE:
WHEN ORDERING SPECIFY LETTERING DESIRED IF ANY

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A155-54T - G9000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-1-653

P-1007

INNER COVER - 182
OUTER COVER - 890
FRAME - 400
SET WEIGHT - 1472
PHOENIX IRON WORKS
castings since 1901

STANDARD 24", 30" & 36" HEAVY DUTY NON-ROCKING TOP FLANGE MANHOLE FRAMES AND COVERS

NOTE:
WHEN ORDERING, SPECIFY LETTERING DESIRED, IF ANY.

P-1008
P-1009
P-1010

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653.

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
PHOENIX IRON WORKS

castings since 1901

STANDARD EXTRA-HEAVY DUTY MANHOLE FRAMES & CASTINGS

FOR AIRPORT CONSTRUCTION

WE SUGGEST OUR FRAME & COVER NUMBERS P-1001, P-1005, P-1006. SEE PAGE 10-18 FOR THE EXTRA HEAVY DUTY LOADING AND WEARING REQUIRED.

CLOSE TOLERANCE MACHINING PREVENTS ROCKING, SHIFTING, OR WEARING.

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO

A.S.T.M SPECIFICATION A159-64T-03000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653.
STANDARD HEAVY DUTY MANHOLE FRAMES
AND OPTIONAL DUST PAN

P-1015

P-1016

FRAME WEIGHT - 200

FRAME WEIGHT - 140

TYPE E

DUST PAN - WEIGHT - 40

NOTE:
COVERS AND GRATE FOR ABOVE FRAMES ON PAGE 69
ALL HORIZONTAL BEARING SURFACES MACHINED

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
PHOENIX IRON WORKS
castings since 1901

STANDARD HEAVY DUTY MANHOLE FRAMES AND COVERS

P-1018 FRAME AND COVER
SET WEIGHT - 330

P-1019 FRAME AND GRATE
SET WEIGHT - 330
FLOW AREA - 120 SQ. IN.

P-1020 FRAME AND COVER
SET WEIGHT - 300

P-1021 FRAME AND GRATE
SET WEIGHT - 300
FLOW AREA - 110 SQ. IN.

NOTE:
ALL HORIZONTAL BEARING AND VERTICAL CONTACT SURFACES MACHINED

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-04T - G300 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653
STANDARD HEAVY DUTY BOLTDOWN MANHOLE FRAMES AND COVERS
BOTTOM FLANGE DESIGN

MANHOLE DESIGNED FOR PRESSURE SYSTEMS AND TO PREVENT VANDALISM

3/4" BOSSES ADDED TO FRAME FOR BOLTING

1/8" FLAT NEOPRENE GASKET

4-1/2" HEX-HEAD STAINLESS STEEL BOLTS

NOTE:
IF SPECIAL HEAD PRESSURE ENGINEERING DESIRED SPECIFY WHEN ORDERING
ALL HORIZONTAL BEARING SURFACES MACHINED ~.125

CATALOG NO. | NO. OF BOLTS | SET WEIGHT
--- | --- | ---
P-1022 | 4 | 341
P-1023 | 5 | 360
P-1024 | 6 | 400

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-653
PHOENIX IRON WORKS
castings since 1901

STANDARD HEAVY DUTY MANHOLE FRAMES AND COVERS

P-1025
FRAME AND COVER

P-1026
FRAME AND COVER

NOTE:
ALL HORIZONTAL BEARING SURFACES MACHINED

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M SPECIFICATION A150-64T-63000 OR UNITED STATES GOVERNMENT SPECIFICATIONS QQ-1-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
PHOENIX IRON WORKS

castings since 1901

STANDARD HEAVY DUTY MANHOLE FRAMES AND COVERS

P-1027
FRAME AND COVER

P-1028
FRAME AND COVER

TYPE R
DIRT PAN
WEIGHT-40

NOTE:
ALL HORIZONTAL BEARING SURFACES MACHINED-125-

SET WEIGHT-430

SET WEIGHT-350

SPECIFY "D" OR "S" ON P-1027, COVER

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO:
A.S.T.M SPECIFICATION A153-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653.

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
STANDARD HEAVY DUTY MANHOLE FRAMES AND COVERS

NOTE:
ALL HORIZONTAL BEARING SURFACES MACHINED

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A158-64T-60000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-465D

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
PHOENIX IRON WORKS

castings since 1901

STANDARD HEAVY DUTY MANHOLE FRAMES AND COVERS
NAVY DEPARTMENT BUREAU OF YARDS AND DOCKS DESIGN

FRAME AND DOUBLE COVERS
SET WEIGHT-1075

P-1035

WHEN ORDERING SPECIFY LETTERING DESIRED IF ANY
ALL HORIZONTAL BEARING SURFACES MACHINED .125

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-54T-53000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-1-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94633
499 Embarcadero, Building 23, Oakland, California 94606
PHOENIX IRON WORKS

castings since 1901

STANDARD HEAVY DUTY MANHOLE FRAME COVER AND GRATE

TOP FLANGE DESIGN
U.S. GOVERNMENT DESIGN

FRAME AND COVER

FRAME AND GRATE

SET WEIGHT-280

SET WEIGHT-280

FLOW AREA-150 SQ. IN.

P-1036

P-1037

WHEN ORDERING SPECIFY LETTERING DESIRED IF ANY.
ALL HORIZONTAL BEARING SURFACES MACHINED.

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A155-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653
STANDARD HEAVY DUTY BOLTDOWN MANHOLE FRAME AND COVER
TOP FLANGE DESIGN
MANHOLES DESIGNED FOR PRESSURE SYSTEMS AND TO PREVENT VANDALISM

FRAME AND COVER

U.S. GOVERNMENT DESIGN

4-1/2" HEX-HEAD STAINLESS STEEL BOLTS

1/8" FLAT NEOPRENE GASKET

SET WEIGHT- 281

NOTE:
IF SPECIAL HEAD PRESSURE ENGINEERING DESIRED SPECIFY WHEN ORDERING
ALL HORIZONTAL BEARING SURFACES MACHINED
WHEN ORDERING SPECIFY LETTERING DESIRED IF ANY

P-1038

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T-G3000 OR UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653
PHOENIX IRON WORKS
castings since 1901

STANDARD MANHOLE FRAMES AND COVERS
FOR STANDARD ELECTRIC AND TELEPHONE CONSTRUCTION

FRAME AND COVER

SET WEIGHT - 750

SPECIFY "TELEPHONE" "ELECTRIC" OR PLAIN COVER LETTERING
ALL HORIZONTAL BEARING SURFACES MACHINED

MANHOLE SET INCLUDES TWO DROP HANDLES FOR COVER

U.S. GOVERNMENT DESIGN
P-1045
STANDARD SUMP FRAMES AND GRATES
FOR ELECTRIC AND TELEPHONE CONSTRUCTION

SUMP FRAME AND GRATE

SET WEIGHT - 50

P-1046
PHOENIX IRON WORKS

castings since 1901

STANDARD 30", 36" & 48" HEAVY DUTY MANHOLE FRAMES AND COVERS
TOP FLANGE U.S. GOVERNMENT DESIGN

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
PHOENIX IRON WORKS  
castings since 1901

BELL TELEPHONE DESIGN MANHOLE FRAMES AND COVERS  
HEAVY DUTY

HOOK HOLES IN FLANGE WEBS  
TO FACILITATE HANDLING AND ANCHORAGE

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>WESTERN ELECTRIC NUMBER</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>T</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1047 SB-27</td>
<td></td>
<td>31</td>
<td>29</td>
<td>18</td>
<td>27</td>
<td>8</td>
<td>52</td>
<td>1</td>
<td>1</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>550</td>
</tr>
<tr>
<td>P-1048 B-27</td>
<td></td>
<td>31</td>
<td>29</td>
<td>18</td>
<td>27</td>
<td>10</td>
<td>46</td>
<td>1</td>
<td>1</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>630</td>
</tr>
<tr>
<td>P-1049 SB-30</td>
<td></td>
<td>34</td>
<td>32</td>
<td>18</td>
<td>30</td>
<td>5</td>
<td>1</td>
<td>46</td>
<td>1</td>
<td>1</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>640</td>
</tr>
<tr>
<td>P-1050 B-30</td>
<td></td>
<td>34</td>
<td>32</td>
<td>18</td>
<td>30</td>
<td>10</td>
<td>46</td>
<td>1</td>
<td>1</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>775</td>
</tr>
</tbody>
</table>

NOTE:  
WHEN ORDERING SPECIFY LETTERING DESIRED IF ANY.  
ALL HORIZONTAL BEARING AND VERTICAL CONTACT SURFACES MACHINED.

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO  
A.S.T.M. SPECIFICATION A159-64T OR GOVERNMENT SPECIFICATIONS QQ-553.

PHOENIX IRON WORKS  
P.O. Box 24123, Oakland, California 94623  
499 Embarcadero, Building 23, Oakland, California 94606  
HEAVY DUTY MANHOLE FRAMES, COVERS AND GRATES
FOR UNDERGROUND POWER TYPE CONSTRUCTION
SEE TABLE BELOW FOR DIMENSIONS

<table>
<thead>
<tr>
<th>CATALOG#</th>
<th>PG &amp; E DWG. NO.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>WT. EA.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1051</td>
<td>034457 CHANGE #3</td>
<td>35</td>
<td>33</td>
<td>1</td>
<td>12</td>
<td>1</td>
<td>4</td>
<td>31</td>
<td>42</td>
<td>3</td>
<td>300</td>
<td>31&quot; FRAME FOR 013302</td>
<td></td>
</tr>
<tr>
<td>P-1052</td>
<td>013302 CHANGE #6</td>
<td>32</td>
<td>30</td>
<td>1</td>
<td>12</td>
<td>1</td>
<td>4</td>
<td>31</td>
<td>42</td>
<td>3</td>
<td>215</td>
<td>31&quot; COVER FOR 034457</td>
<td></td>
</tr>
<tr>
<td>P-1053</td>
<td>034458</td>
<td>43</td>
<td>30</td>
<td>1</td>
<td>12</td>
<td>1</td>
<td>4</td>
<td>35</td>
<td>50</td>
<td>4</td>
<td>365</td>
<td>39&quot; FRAME FOR 013299</td>
<td></td>
</tr>
<tr>
<td>P-1054</td>
<td>013299 CHANGE #5</td>
<td>40</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>1</td>
<td>4</td>
<td>30</td>
<td>40</td>
<td>4</td>
<td>350</td>
<td>39&quot; COVER FOR 034458</td>
<td></td>
</tr>
</tbody>
</table>

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATIONS A159-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653
NOTE: ALL BEARING HORIZONTAL AND VERTICAL SURFACES MACHINED TO 125
PHOENIX IRON WORKS

castings since 1901

STANDARD HEAVY DUTY 36" MANHOLE FRAMES AND COVERS

P-1056
FRAME AND COVER

SET WEIGHT - 830

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
STANDARD HEAVY DUTY 36" MANHOLE FRAMES AND COVERS

P-1057
FRAME AND COVER

SET WEIGHT - 520
STANDARD SIDEWALK MANHOLE FRAMES, COVERS AND GRATES
LIGHT TRAFFIC

FRAME AND COVER

GRATE

CATALOG NUMBER

<table>
<thead>
<tr>
<th>FRAME &amp; COVER</th>
<th>FRAME &amp; GRATE</th>
<th>A</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>K</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V</th>
<th>APPROX SET WT</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1065</td>
<td>P-1070</td>
<td>12</td>
<td>16</td>
<td>14½</td>
<td>14 ½</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>17</td>
<td>1 ½</td>
<td>2 ½</td>
<td>2 ½</td>
<td>½</td>
<td>1 ½</td>
</tr>
<tr>
<td>P-1066</td>
<td>P-1071</td>
<td>18</td>
<td>21 ½</td>
<td>19 ½</td>
<td>19 ½</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>23</td>
<td>2 ½</td>
<td>2 ½</td>
<td>2 ½</td>
<td>½</td>
<td>2 ½</td>
</tr>
<tr>
<td>P-1067</td>
<td>P-1072</td>
<td>24</td>
<td>28</td>
<td>26</td>
<td>25 ½</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>30</td>
<td>2 ½</td>
<td>2 ½</td>
<td>2 ½</td>
<td>½</td>
<td>2 ½</td>
</tr>
<tr>
<td>P-1068</td>
<td>P-1073</td>
<td>30</td>
<td>34 ½</td>
<td>32 ½</td>
<td>32 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>43</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
</tr>
<tr>
<td>P-1069</td>
<td>P-1074</td>
<td>36</td>
<td>40 ½</td>
<td>38 ½</td>
<td>38 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>43</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
<td>1 ½</td>
</tr>
</tbody>
</table>

NOTE: HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATIONS A158-84T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-653
STANDARD TOP FLANGE FIELD INLET CRATES

FOR USE WITH REINFORCED CONCRETE OR CORRUGATED STEEL PIPE CONSTRUCTION

DESIGNED FOR LIGHT VEHICLE TRAFFIC ONLY
DESIGNED TO FIT EASILY AND SNUGLY INTO EITHER RCP OR CSP

NOTE:
CASTINGS DIPPED IN ASPHALT PAINT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATIONS A159-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653
STANDARD HEAVY DUTY MANHOLE COVER AND GRATE

P-1077

NOTE: HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATIONS A159-84T G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-633
PHOENIX IRON WORKS

Casting since 1901

STANDARD LIGHT DUTY MANHOLE FRAMES AND COVERS

P-1078

FRAME AND COVER

ALL HORIZONTAL BEARING AND VERTICAL CONTACT SURFACES MACHINED TO .125

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATIONS A159-94T-C3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
LIGHT DUTY MANHOLE FRAMES AND COVERS

ALL HORIZONTAL BEARING AND VERTICAL CONTACT SURFACES MACHINED TO 125

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATIONS A159-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
STANDARD LIGHT DUTY MANHOLE FRAMES AND COVERS

P-1081

NOTE: ALL HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATIONS A159-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-663
STANDARD LIGHT DUTY MANHOLE FRAMES AND COVERS

P-1082

P-1083

FRAME AND HEAVY DUTY GRATE TO ABOVE DESIGN

SET WEIGHT - 270 -

SET WEIGHT - 325 -

NOTE: ALL HORIZONTAL BEARING AND VERTICAL CONTACT SURFACES MACHINED TO 125

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO

A.S.T.M. SPECIFICATIONS A159-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-1-663
PHOENIX IRON WORKS

castings since 1901

26” CLEAR OPENING FOR ELECTRIC INSTALLATIONS
FULL TRAFFIC TYPE NON-ROCKING MANHOLE COVER

P-1084 COVER

NEW RIBLESS HEMISPHERICAL COVER DESIGN
DESIGNED FOR H-20 HIGHWAY LOADING

DATA:

1. Designed for use with P-1084 frame on page 43. Cover fully machined on 3 surfaces to assure interchangeability and close, quiet fit.
3. Skid resistant cover design. Refer to ASTM special publication No. 326, 1962.
5. All material used in manufacturing shall conform to ASTM specification A155-64T-G3000 or of United States government specification QQ1-653.
6. Available with “O” RING SEAL and CLOSED PICKHOLE for applications where infiltration may be a problem.
7. Proof load test: meets requirements of federal specification RR-F-621(b) per par. 4.4.1 and par 38.1.

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606

53
26" CLEAR OPENING FOR ELECTRIC INSTALLATIONS
FULL TRAFFIC TYPE NON-ROCKING MANHOLE FRAME
P-1084 FRAME

DATA:
1. USED BY CCCSD, CITY OF SALINAS, AND FOR ELECTRIC INSTALLATIONS.
2. P-1084 COVER: MACHINED NON-ROCKING COVER WITH ASTM SKID RESISTANT GRID PATTERN ILLUSTRATED ON REVERSE SIDE OF THIS SHEET.
3. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO ASTM SPECIFICATION A159-64T-G3000 OR UNITED STATES GOVERNMENT SPECIFICATION QQ1-653.
4. DESIGNED FOR H20 HIGHWAY LOADING.
FEDERAL SPECIFICATION MANHOLE COVER
(PER RR-F-621b, SEPT. 14, 1967)
P-1088 COVER

DIMENSIONS FOR TYPE A, MANHOLE COVER, TRAFFIC.

<table>
<thead>
<tr>
<th>STYLE</th>
<th>SIZE</th>
<th>A</th>
<th>B</th>
<th>APPROX. WT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRAIGHT NON-LOCKING</td>
<td>24A</td>
<td>25-1/2&quot;</td>
<td>1-3/8&quot;</td>
<td>180.0 lbs.</td>
</tr>
</tbody>
</table>

DATA:
1. REFERENCE FEDERAL SPECIFICATION RR-F-621b, SEPT. 14, 1967.
2. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO FEDERAL SPECIFICATION QQ-1-652 AND ASTM A 48 CLASS 30 FOR CAST IRON.
3. FRAME: USE P-1087 FRAME SHOWN ON CATALOG PAGE 44c
FEDERAL SPECIFICATION MANHOLE FRAME
(PER RR-F-621b, SEPT. 14, 1967)
P-1087 FRAME

FIGURE 1. TYPE I, STYLE A
STRAIGHT TRAFFIC FRAME—24" CLEAR OPENING

<table>
<thead>
<tr>
<th>STYLE</th>
<th>SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>G</th>
<th>APPROX WT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>24A</td>
<td>26&quot;</td>
<td>1-3/8&quot;</td>
<td>24&quot;</td>
<td>26-1/2&quot;</td>
<td>7&quot;</td>
<td>4&quot;</td>
<td>240 lbs.</td>
</tr>
</tbody>
</table>

DATA:
1. REFERENCE FEDERAL SPECIFICATION RR-F-621b, SEPT. 14, 1967
2. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO FEDERAL SPECIFICATION QQ-I-652 AND ASTM A48 CLASS 30 FOR CAST IRON.
3. COVER: USE P-1088 COVER SHOWN ON CATALOG PAGE 44d
STANDARD MONUMENT FRAMES & COVERS

TYPICAL INSTALLATION

P-2001
FRAME AND COVER

P-2002
BRONZE MARKER

P-2003
FRAME AND COVER

SILENT KNIGHT

WEIGHT EACH - 11 OZ.

SET WEIGHT - 45

SET WEIGHT - 50

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
P-2001-A MONUMENT & FRAME

ALSO AVAILABLE
"MONUMENT" ONLY

RECESSED AREA
FOR LIFTING BOLT

NOTE: RISER RINGS AVAILABLE
IN 1.5 - 2 - 2.5 INCH RISES

CASTINGS DIPPED IN ASPHALT PAINT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO A.S.T.M.
SPECIFICATION A150-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATION QQ1-653
BELL TYPE RING & GRATE
PJ 1116 & PJ 1117

TOTAL GRATE OPENING = 45 SQ IN
FRAME & GRADE FOR 18" T&G PIPE
PJ-1114 FRAME
PJ-1115 GRADE

SET WEIGHT - 80
FLOW AREA - 83 SQ. IN.
STANDARD LAMPHOLE FRAMES & COVERS

BOTTOM FLANGE DESIGN

TOP FLANGE DESIGN

TYPICAL INSTALLATION

P-2501
FRAME & COVER
SET WEIGHT: 53 lb.
HORIZONTAL BEARING SURFACES GROUND TO FIT

P-2502
A-4"
FRAME & COVER
SET WEIGHT: 35 lb.

P-2503
A-7"
FRAME & COVER
SET WEIGHT: 40 lb.

ALL MATERIALS USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-641-G3000 OR UNITED STATES GOVERNMENT SPECIFICATION 001-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606

61
STANDARD LAMPHOLE FRAMES & COVERS

P-2504  FRAME & GRATE
SET WEIGHT: 186

P-2505  FRAME & GRATE
SET WEIGHT: 190

P-2506  FRAME, PERFORATED
COVER & DUST PAN
SET WEIGHT: 205

P-2508  FRAME & COVER
SET WEIGHT: 31

NOTE:
Horizontal bearing surfaces
ground to fit.

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T-83000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653.
CAST IRON HEAVY DUTY TRENCH RAILS AND GRATES

TYPICAL INSTALLATION

NOTE:
When ordering give linear footage desired additional charge for cutting to odd length horizontal bearing surfaces on rails and grates ground to fit.

TRENCH GRATES ONLY

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>C</th>
<th>F</th>
<th>G</th>
<th>L</th>
<th>O</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-3010</td>
<td>1</td>
<td>1/2</td>
<td>6</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P-3011</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P-3012</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P-3013</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P-3014</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P-3015</td>
<td>1</td>
<td>1/2</td>
<td>18</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P-3016</td>
<td>1</td>
<td>1/2</td>
<td>20</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P-3017</td>
<td>1</td>
<td>1/2</td>
<td>22</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P-3018</td>
<td>1</td>
<td>1/2</td>
<td>24</td>
<td>24</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - G3000 OR UNITED STATES GOVERNMENT SPECIFICATIONS QQ-1-653
CAST IRON HEAVY DUTY TRENCH RAILS AND GRATES

NOTE:
WHEN ORDERING GIVE LINEAR FOOTAGE DESIRED
ADDITIONAL CHARGE FOR CUTTING TO ODD LENGTH
HORIZONTAL BEARING SURFACES ON RAILS AND GRATES GROUND TO FIT
SEE PAGE 53 FOR GRATES SEPARATELY

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606

64
LIGHT DUTY CATCHBASINS, FRAMES, GRATES AND COVERS

TYPICAL INSTALLATION

BOTTOM FLANGE DESIGN

TOP FLANGE DESIGN

LIGHT DUTY TOP FLANGE FRAME AND GRATE

CATALOG NO. | GRATE OVERALL | CLEAR OPENING | OVERALL FRAME | FRAME HEIGHT | SET WEIGHT
---|---|---|---|---|---
P-4001 | 6 x 6 | 5 x 5 | 8 x 8 | 1 | 7
P-4002 | 9 1/2 x 9 1/2 | 8 x 8 | 12 x 12 | 1 | 18
P-4003 | 12 x 12 | 11 x 11 | 15 x 15 | 1 | 35

NOTE:
HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - GJ2000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653

65
STANDARD HEAVY DUTY SQUARE CATCH BASIN
FRAMES COVERS AND GRATES

BOTTOM FLANGE DESIGN

HORIZONTAL BEARING SURFACES GROUND TO FIT

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>FRAME AND GRATE</th>
<th>FRAME AND COVER</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>NO. OF Holes</th>
<th>FLOW AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-4101</td>
<td>P-4110</td>
<td>12</td>
<td>18</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>P-4102</td>
<td>P-4111</td>
<td>16</td>
<td>22</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>14</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>117</td>
<td></td>
</tr>
<tr>
<td>P-4103</td>
<td>P-4112</td>
<td>18</td>
<td>24</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>20</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>148</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4104</td>
<td>P-4113</td>
<td>20</td>
<td>26</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>22</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>182</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4105</td>
<td>P-4114</td>
<td>24</td>
<td>30</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>26</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>223</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4106</td>
<td>P-4115</td>
<td>30</td>
<td>36</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>32</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>239</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4107</td>
<td>P-4116</td>
<td>36</td>
<td>42</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>38</td>
<td>1</td>
<td>1</td>
<td>15</td>
<td>490</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4108</td>
<td>P-4117</td>
<td>42</td>
<td>48</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>44</td>
<td>1</td>
<td>1</td>
<td>16</td>
<td>629</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4109</td>
<td>P-4118</td>
<td>48</td>
<td>54</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>52</td>
<td>1</td>
<td>2</td>
<td>18</td>
<td>812</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - 63000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653
# Standard Heavy Rectangular Catchbasin

## Frame Covers and Grates

**Bottom Flange Style**

### Catalog Number

<table>
<thead>
<tr>
<th>Frame and Grate</th>
<th>Frame and Cover</th>
<th>Frame Cover Grade</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>No. of Grates</th>
<th>No. of Ribs</th>
<th>Approx. Flow Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-4201</td>
<td>P-4211</td>
<td></td>
<td>12</td>
<td>18</td>
<td>18</td>
<td>24</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>20</td>
<td>1/2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>P-4202</td>
<td>P-4212</td>
<td></td>
<td>12</td>
<td>24</td>
<td>18</td>
<td>30</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>26</td>
<td>1/2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>P-4203</td>
<td>P-4213</td>
<td></td>
<td>18</td>
<td>24</td>
<td>24</td>
<td>30</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>20</td>
<td>26</td>
<td>1/2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>P-4204</td>
<td>P-4214</td>
<td></td>
<td>18</td>
<td>30</td>
<td>24</td>
<td>36</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>20</td>
<td>32</td>
<td>1/2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>P-4205</td>
<td>P-4215</td>
<td></td>
<td>18</td>
<td>36</td>
<td>24</td>
<td>44</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>32</td>
<td>20</td>
<td>1/2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>P-4206</td>
<td>P-4216</td>
<td></td>
<td>24</td>
<td>30</td>
<td>30</td>
<td>36</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>26</td>
<td>32</td>
<td>1/2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>P-4207</td>
<td>P-4217</td>
<td></td>
<td>24</td>
<td>36</td>
<td>30</td>
<td>42</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>26</td>
<td>38</td>
<td>1/2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>P-4208</td>
<td>P-4218</td>
<td></td>
<td>30</td>
<td>38</td>
<td>36</td>
<td>44</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>32</td>
<td>20</td>
<td>1/2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>P-4209</td>
<td>P-4219</td>
<td></td>
<td>36</td>
<td>42</td>
<td>42</td>
<td>48</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>38</td>
<td>44</td>
<td>1/2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>P-4210</td>
<td>P-4220</td>
<td></td>
<td>36</td>
<td>48</td>
<td>42</td>
<td>56</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>38</td>
<td>26</td>
<td>1/2</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note:** Horizontal bearing surfaces ground to fit

*All material used in manufacturing shall conform to A.S.T.M. Specification A159-64T-63000 or of United States Government Specifications QQ1-653*
STANDARD HEAVY DUTY RECTANGULAR CATCHBASIN
FRAME COVERS AND GRATES

TOP FLANGE DESIGN

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>FRAME AND COVER</th>
<th>FRAME COVER GRATE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>NO. OF GRATES</th>
<th>NO. OF EYES</th>
<th>NO. OF RINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-4301 P-4311</td>
<td>12.24</td>
<td>18.24</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>14.20</td>
<td>0.25</td>
<td>1</td>
<td>10</td>
<td>89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4302 P-4312</td>
<td>18.24</td>
<td>24.24</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>20.24</td>
<td>0.25</td>
<td>1</td>
<td>14</td>
<td>124</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4303 P-4313</td>
<td>24.24</td>
<td>30.24</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>26.24</td>
<td>0.25</td>
<td>1</td>
<td>11</td>
<td>204</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4304 P-4314</td>
<td>30.24</td>
<td>36.24</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>32.24</td>
<td>0.25</td>
<td>1</td>
<td>14</td>
<td>255</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4305 P-4315</td>
<td>36.24</td>
<td>42.24</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>38.24</td>
<td>0.25</td>
<td>1</td>
<td>16</td>
<td>383</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4306 P-4316</td>
<td>42.24</td>
<td>48.24</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>44.24</td>
<td>0.25</td>
<td>1</td>
<td>14</td>
<td>510</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4307 P-4317</td>
<td>48.24</td>
<td>54.24</td>
<td>4</td>
<td>7</td>
<td>1</td>
<td>50.24</td>
<td>0.25</td>
<td>1</td>
<td>16</td>
<td>603</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4308 P-4318</td>
<td>54.24</td>
<td>60.24</td>
<td>4</td>
<td>8</td>
<td>1</td>
<td>56.24</td>
<td>0.25</td>
<td>1</td>
<td>14</td>
<td>782</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - G3000 OR UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653
STANDARD HEAVY DUTY CATCHBASIN FRAMES AND GRATINGS
AS DESIGNED FOR SAFEWAY STORES INC.

P-4601
SET WEIGHT - 400 LB.

FRAME WITH EXTRA THIN GRATING FOR PEDESTRIAN AREAS, IN COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT.

DESIGNED FOR USE IN PARKING LOT ENTRANCES, GAS STATION OR ANY AREA WHERE LADIES' HIGH HEELS ARE WORN.

P-4602
SET WEIGHT - 384 LB.

FRAME & GRATE
(SEE NEXT PAGE FOR 36" SIZE)

HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653
STANDARD HEAVY DUTY CATCHBASIN FRAME & GRATE
AS DESIGNED FOR SAFEWAY STORES INC.

P-4611

FRAME WITH EXTRA THIN GRATING FOR
PEDESTRIAN AREAS, IN COMPLIANCE WITH
THE AMERICANS WITH DISABILITIES ACT.

DESIGNED FOR USE IN PARKING LOT ENTRANCES,
GAS STATION OR ANY AREA WHERE
LADIES' HIGH HEELS ARE WORN.

HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T-G3000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
STANDARD HEAVY DUTY CATCHBASIN FRAME AND GRATE
AS DESIGNED BY SAFEWAY STORES INC.

P-4612
FRAME & GRATE
SET WEIGHT - 585 LB.
FLOW AREA - 792 SQ. IN.

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - G3600 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653
ALL HORIZONTAL SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-84T-63000 OR UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653
STANDARD NON-SHIFTING MANHOLE EXTENSION RINGS
FOR USE WITH P-1001, P-1005 & P-1006 MANHOLES

A QUICK & INEXPENSIVE METHOD FOR RAISING MANHOLE COVERS DUE TO PAVEMENT RESURFACING

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>A</th>
<th>COVER THICKNESS</th>
<th>FOR USE WITH MANHOLE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-5001</td>
<td>252</td>
<td>1 1/4</td>
<td>P-1001</td>
</tr>
<tr>
<td>P-5002</td>
<td>312</td>
<td>1 1/2</td>
<td>P-1005</td>
</tr>
<tr>
<td>P-5003</td>
<td>374</td>
<td>1 1/2</td>
<td>P-1006</td>
</tr>
</tbody>
</table>

NOTE:
RISES AVAILABLE IN 1-5/8" & 2-1/2"
WHEN ORDERING, GIVE CATALOGUE NUMBER TO INDICATE SIZE, ALSO INDICATING THE DESIRED RISE.
EXAMPLE

```
<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>CAT. NO.</th>
<th>RISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>P-5001</td>
<td>1-1/8&quot;</td>
</tr>
</tbody>
</table>
```

FOR RISES ABOVE 3-1/2", WE SUGGEST DIGGING UP AND REPLACING THE MANHOLE TO GRADE.

CLOSE TOLERANCE MACHINING ON ALL CONTACT SURFACES INSURES UNIFORM FIT, LESS SHIFTING & WEAR.

MEETS ASTM A48 CLASS 30
DESIGNED FOR COMPRESSION LOADING
FAR EXCEEDS H-20 LOADING 100,000 PSI.

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO A.S.T.M. SPECIFICATION A150-64T OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ1-653.

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
STANDARD MANHOLE EXTENSION RINGS
A QUICK & INEXPENSIVE METHOD OF RAISING MANHOLE COVERS

EXTENSION RING ASSEMBLY
INCLUDES 3-3/8" SET SCREWS

TYPICAL INSTALLATION

AVAILABLE IN 1 1/2" AND 2" RISES FOR 24" MANHOLE SETS

FOR RISES ABOVE 3 1/2"
WE SUGGEST DIGGING UP
AND REPLACING MANHOLE TO GRADE

D
C
H

ALL HORIZONTAL BEARING AND
CONTACT SURFACES MACHINED

WHEN ORDERING GIVE CATALOGUE
NUMBER TO INDICATE SIZE,
ALSO INDICATE DESIRED RISE

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>C</th>
<th>D</th>
<th>H</th>
<th>DESIGNED TO RECEIVE COVER WITH DIA. AND THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-5101</td>
<td>26</td>
<td>1</td>
<td>25 3/4</td>
<td>25 3/4 x 1</td>
</tr>
<tr>
<td>P-5102</td>
<td>26 1/2</td>
<td>26 1/2</td>
<td>26 1/2 x 1</td>
<td></td>
</tr>
<tr>
<td>P-5103</td>
<td>28</td>
<td>7/8</td>
<td>27 3/4</td>
<td>27 3/4 x 7/8</td>
</tr>
</tbody>
</table>

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T-03000 OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653
ALAMEDA FLOOD CONTROL & WATER CONSERVATION DISTRICT STANDARD

STANDARD MANHOLE RISER RING

TYPE 1

1/2" threaded holes with 1" long headless set screws at 1/3 points on ring. Total of 3 required.

PLAN

CAST IRON RISER RING

CAST IRON RISER RING

40 1/4" dia.
38 1/4" dia.
1 1/4" thick
2" thick
1 5/8" thick
2"

36" dia.
37 1/2" max. dia. (tolerance = - 1/16"

1/2" Set Screw (See Plan View)

NOTES:

1. All contact and bearing surfaces of Riser Ring shall be machined flat and true.
2. The Manholes Riser Ring shall be cast iron conforming to ASTM Serial Designation A-48, Class 30.
3. Tolerances for dimensions shown shall be of an order equivalent to the standard for the industry unless otherwise indicated.
P-6001
FRAME GRATE & HOOD
SET WEIGHT: 256 LB.

NOTE:
1) WHEN ORDERING SPECIFY CURB PIECE WITH OR WITHOUT STEEL BAR
2) ALSO SPECIFY HIGH FLOW OR REGULAR FLOW GRATE

HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T-63000 OR UNITED STATES GOVERNMENT SPECIFICATIONS QQI-653

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
STANDARD HEAVY DUTY FRAME GRATES & HOODS

P-6002
FRAME GRATE & HOOD
SET WEIGHT - 600

P-6003
FRAME GRATE & HOOD
SET WEIGHT - 500

RAISED LETTERING ON TOP OF HOOD READS:
PHOENIX IRON WORKS
OAKLAND, CALIFORNIA

NOTE:
WHEN ORDERING SPECIFY CURB PIECE WITH OR WITHOUT STEEL BAR
HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A159-64T - 03000 OR UNITED STATES GOVERNMENT SPECIFICATIONS QQI-6353

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
P-6004
FRAME GRATE & CURB ANGLE
SETWEIGHT - 430
ALL-WELDED CONSTRUCTION

P-6005
FRAME GRATE & HOOD
SETWEIGHT - 655
STEEL INLET FRAMES, GRATING & CURB PIECES

P-6006
FRAME GRATE & CURB ANGLE
SET WEIGHT - 175

P-6007
HEAVY DUTY
FRAME GRATE & CURB ANGLE
SET WEIGHT - 525

P-6008
HEAVY DUTY
FRAME GRATE & CURB ANGLE
SET WEIGHT - 310
STANDARD HEAVY DUTY ROLL-TYPE CATCHBASIN FRAMES AND GRATES FOR CONTOURED GUTTER AREAS

P-6101
SET WEIGHT - 350

P-6102
SET WEIGHT - 265

NOTE:
HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A-159-84T-G6300 OR UNITED STATES GOVERNMENT SPECIFICATION QQ1-683
STANDARD HEAVY DUTY
CATCHBASIN FRAMES AND GRATES
FOR CONTOURED GUTTER AREAS

P-6103
FRAME & GRATE
SET WEIGHT -270

HORSE SHOE TYPE FOR CURB AREA

P-6104
FRAME & GRATE
SET WEIGHT -506

NOTE:
HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A-158-64T-G500 OR UNITED STATES GOVERNMENT SPECIFICATION QQ1-653
### Catalog Number Implies Frame & Grate Set

#### Frame & Grate

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Inlet Opening</th>
<th>Height</th>
<th>Approx. Weight</th>
<th>Opening Between Bars</th>
<th>No. of Bars</th>
<th>Open Flow Area</th>
<th>Approx. Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-6201</td>
<td>24 x 24</td>
<td>4</td>
<td>90</td>
<td>3 1/2</td>
<td>12</td>
<td>75% 260</td>
<td></td>
</tr>
<tr>
<td>P-6202</td>
<td>24 x 24</td>
<td>4</td>
<td>90</td>
<td>3 1/2</td>
<td>15</td>
<td>66% 320</td>
<td></td>
</tr>
<tr>
<td>P-6203</td>
<td>24 x 24</td>
<td>4</td>
<td>90</td>
<td>3 1/2</td>
<td>18</td>
<td>54% 380</td>
<td></td>
</tr>
<tr>
<td>P-6204</td>
<td>18 x 18</td>
<td>4</td>
<td>80</td>
<td>3 1/2</td>
<td>9</td>
<td>75% 195</td>
<td></td>
</tr>
<tr>
<td>P-6205</td>
<td>24 x 24</td>
<td>4</td>
<td>90</td>
<td>3 1/2</td>
<td>9</td>
<td>81% 200</td>
<td></td>
</tr>
</tbody>
</table>

---

### All-Welded Construction

### P-6221

#### Frame & Grate

**Set Weight - 286**

Frame is welded construction
Grate is bolted construction
With pipe spacers between bars

**Note:**

Stud anchors used on all steel sets
All welded construction

---

**Phoenix Iron Works**
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
CAST IRON CATCHBASIN ASSEMBLIES
DESIGNED BY STANDARD OIL COMPANY OF CALIFORNIA

NOTE:
ASSEMBLY INCLUDES BRASS PIPE Plug & GRATING

REFINERY
CAST IRON CATCH BASIN

<table>
<thead>
<tr>
<th>P-6701</th>
<th>CATALOG NUMBER</th>
<th>P-6702</th>
</tr>
</thead>
<tbody>
<tr>
<td>78325-C</td>
<td>8 INCH OUTLET</td>
<td>78325-D</td>
</tr>
<tr>
<td>A</td>
<td>8 1/8</td>
<td>9 1/8</td>
</tr>
<tr>
<td>B</td>
<td>8 3/4</td>
<td>8 1/4</td>
</tr>
<tr>
<td>C</td>
<td>3 1/2</td>
<td>3 1/2</td>
</tr>
<tr>
<td>D</td>
<td>3 1/4</td>
<td>3 1/4</td>
</tr>
</tbody>
</table>

DESCRIPTION
X CATCH BASIN BODY NUMBER 78325-C
Y 11 1/8 DIA. CLOSE RIVETED GRATING 1 1/2
Z 3" STANDARD BRASS PIPE PLUG

SET WEIGHT - 285 LB.

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A-159-64T-G5300 OR OF UNITED STATES GOVERNMENT SPECIFICATION QQ-663

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
Telephone (610) 466-9900  www.PhoenixIronWorks1901.com  Facsimile (610) 465-9903
STANDARD FLUSHING INLET FRAMES & COVERS
FOR 6" & 8" PIPE

P-7001 FRAME & COVER
SET WEIGHT - 120
TYPICAL INSTALLATION

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A-159-64T - G8300 OR OF UNITED STATES GOVERNMENT SPECIFICATION QQ1-653
STANDARD FLUSHING INLET FRAMES & COVERS

P-7002 FRAME & COVER
SET WEIGHT - 82

P-7003 FRAME & COVER
SET WEIGHT - 155

P-7004 FRAME & COVER
SET WEIGHT - 138

TYPICAL INSTALLATION

NOTE:
ALL HORIZONTAL BEARING SURFACES GROUND TO FIT

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A-159-84T-C6300 OR UNITED STATES GOVERNMENT SPECIFICATION QQ1-653
STANDARD FLUSHING INLET FRAMES & COVERS

FOR 4" PIPE

P-7101
FRAME & COVER
SET WEIGHT - 26

FOR 3" PIPE

P-7102
FRAME & COVER
SETWEIGHT - 25

FOR 6" PIPE

P-7103
FRAME & COVER
SET WEIGHT - 58

P-7104
FRAME & COVER
SET WEIGHT - 68

NOTE:
ALL HORIZONTAL BEARING SURFACES GROUND TO FIT
CASTINGS TO FIT INSIDE PIPE

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A-139-64T-G6300 OR OF UNITED STATES GOVERNMENT SPECIFICATION QQ-1-883

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
STANDARD BULLET-TYPE WHEELGUARDS

TYPICAL INSTALLATION

BULLET TYPE

<table>
<thead>
<tr>
<th>CATALOG NO.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-8001</td>
<td>8</td>
<td>12</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P-8002</td>
<td>12</td>
<td>18</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>P-8003</td>
<td>12</td>
<td>20</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>P-8004</td>
<td>12</td>
<td>24</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A-159-64T-G6300 OR OF UNITED STATES GOVERNMENT SPECIFICATION QQ-663
STANDARD DOCK CASTINGS

P-9001
DOUBLE MOORING BOLLARD
EACH WEIGHS 1600 LB.

AVAILABLE IN GRAY IRON, DUCTILE IRON & STEEL
P-9101
SINGLE
MOORING BOLLARD
EACH WEIGHS 1944 LB.

BOTH AVAILABLE IN GRAY IRON, DUCTILE IRON & STEEL

P-9102
SINGLE
MOORING POST
EACH WEIGHS 1600 LB.
P-9103
42" MOORING CLEAT
EACH WEIGHS 360 LB.

P-9104
STANDARD MOORING CLEAT
EACH WEIGHS 345 LB.

BOTH AVAILABLE IN GRAY IRON, DUCTILE IRON & STEEL
STANDARD EXTRA HEAVY DUTY
MANHOLE FRAMES, COVERS & GRATES
FOR AIRPORT CONSTRUCTION
TOP FLANGE DESIGN

24" CLEAR OPENING

18" CLEAR OPENING

P-9501 FRAME & COVER
SET WEIGHT 335

P-9502 FRAME & COVER
SET WEIGHT 335

P-9503 FRAME & COVER
SET WEIGHT 455

P-9504 FRAME & COVER
SET WEIGHT 455

U.S. GOVERNMENT DESIGN

NOTE: ALL HORIZONTAL BEARING SURFACES MACHINED TO 125

ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO
A.S.T.M. SPECIFICATION A- 159-64T-6G300 OR OF UNITED STATES GOVERNMENT SPECIFICATION QQ1-663

PHOENIX IRON WORKS
P.O. Box 24123, Oakland, California 94623
499 Embarcadero, Building 23, Oakland, California 94606
Telephone (610) 465-9900  www.PhoenixIronworks1901.com  Facsimile (610) 465-9903

91
STANDARD EXTRA HEAVY DUTY
TRENCH RAILS & GRATES
DESIGNED FOR AIRPORT CONSTRUCTION

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>FRAME/GRATE GRATES ONLY</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
<th>Q</th>
<th>T</th>
<th>U</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-9601</td>
<td>P-9611</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
<td>6</td>
<td>19</td>
<td>14</td>
<td>105</td>
<td>24</td>
<td>1</td>
<td>48</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P-9602</td>
<td>P-9612</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
<td>8</td>
<td>21</td>
<td>14</td>
<td>22</td>
<td>24</td>
<td>1</td>
<td>48</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P-9603</td>
<td>P-9613</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
<td>12</td>
<td>25</td>
<td>16</td>
<td>16</td>
<td>24</td>
<td>1</td>
<td>48</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P-9604</td>
<td>P-9614</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>29</td>
<td>20</td>
<td>20</td>
<td>24</td>
<td>1</td>
<td>48</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P-9605</td>
<td>P-9615</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
<td>20</td>
<td>31</td>
<td>22</td>
<td>22</td>
<td>24</td>
<td>1</td>
<td>48</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P-9606</td>
<td>P-9616</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
<td>22</td>
<td>33</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>1</td>
<td>48</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P-9607</td>
<td>P-9617</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
<td>24</td>
<td>37</td>
<td>26</td>
<td>26</td>
<td>24</td>
<td>1</td>
<td>48</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P-9608</td>
<td>P-9618</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
<td>30</td>
<td>43</td>
<td>34</td>
<td>34</td>
<td>24</td>
<td>1</td>
<td>48</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
STAR WASHER

6½" Diameter

½" Center Hole
Attention: Cities, Counties, & Water Agencies

**Services Provided:** We will assist in measuring on site and meet with you to analyze the best solutions

**Products:**
- Manhole Frames, Covers, & Grates in Cast Iron
- Monuments, Curb Inlets, Flushing Inlets in Cast Iron
- Fabricated Grates in Steel
- Environmental Filters for Catch Basins
- Water-Tight Covers for Closed Sanitary Sewers
- Ornamental Castings and Fabrications for Buildings and Landscaped Areas.

**NEW CONSTRUCTION or REPLACEMENT.**

**REPLACEMENT IS OUR SPECIALTY!**